

## Indiana Immigration and Workforce Patterns



June 2007

## I. Introduction

We live in an age of global mass migration.<sup>1</sup> Nearly 200 million people today live outside the borders of the countries in which they were born, a higher number than ever before. If they constituted a single country, it would be about the fifth most populous in the world—and it would be growing faster than any other. About a fifth of this hypothetical country of immigrants—more than 38 million—lives in the United States (US), comprising between 12 and 13 percent of the US population. (Although the US has more immigrants than any single country, Europe is home to about a third of the world total.)

The United Nations divided the 191 million immigrants in the world in 2005 into three nearly equal sized stocks: 67 million who moved from developed countries (“North”) either to other developed countries or to developing countries (“South”); 62 million who moved from developing South to developed North; and 61 million who moved from one developing country to another.<sup>2</sup>

<b>North → North:</b>	<b>53 million</b>
<b>North → South:</b>	<b>14 million</b>
<b>South → North:</b>	<b>62 million</b>
<b>South → South:</b>	<b>61 million</b>

Those who debate immigration in states such as Indiana tend to focus on the flow of immigrants from South to North. This Working Paper explores the importance to Indiana of working-age people moving from Mexico and Latin America, Asia, and Africa. For many of the state’s counties, this inflow is the main factor keeping their populations—and thus their economies—from shrinking dramatically. But the South-to-North flow to Indiana is not the only one that matters. Until not too long ago, most of the state’s immigrant population came from other developed countries, particularly in Europe. Immigrants from Europe, Japan, and other “North” countries (which include Australia and New Zealand) may become even more vital as Indiana’s cutting-edge corporations in fields such as the life sciences and information technology compete for the world’s very best educated and most creative talents. Of course many of these highly skilled creative talents come from the South as well.

In short, immigration is a more complex story than much of our current public discourse recognizes.

We propose to make the story both more and less complicated. As the first product of Sagamore’s 18-month Immigration and Higher Education Project, this Working Paper examines several important contextual issues. According to the latest available data, 242,281 residents of Indiana were born outside the US. Far more dramatic than the number of immigrants who now call Indiana home is the speed with which the state’s immigrant population is growing, particularly relative to other trends in the state’s population. In the first five years of this decade, the immigrant population grew by almost 56,000. This may seem tiny compared to global patterns of mass migration, but it certainly matters to the state. From 2000 to 2005, Indiana’s total population grew by just less than 13,000, suggesting Indiana would have suffered outright population decline if not for immigrant growth.<sup>3</sup>

Section II, which follows this introductory section, looks at one of the most important factors driving immigration in Indiana (and the world’s other developed economies): A combination of declining fertility rates and lengthening life-spans is producing an aging population in which soon a shrinking workforce will be expected to support a rapidly increasing retired population.

All other things being equal, attracting more immigrants may be the state's best chance to defuse this impending and inevitable demographic crunch.

Section III and Appendix 1 look more carefully at the state's immigrants, at their home countries and at where they are settling in Indiana. This is a relatively superficial analysis: later parts of the study of immigration and higher education will examine in greater depth the implications of differences between different national groups. Section III introduces a theme that Section IV analyzes more thoroughly: Not every region in Indiana will benefit from a booming state economy. Most of the industries that policymakers have identified as most important for strong economic growth will cluster in and around Indianapolis, leaving much of the rest of the state scrambling to survive. The exception is advanced manufacturing, which may benefit communities around the state outside the Indianapolis metro-cluster. Which path the state follows will have critical implications for immigrants and for worker training.

Section V examines the jobs that are likely to emerge in Indiana over the next several years. Paradoxically perhaps, the best forecasts available seem to say that jobs of the future will require both more *and* little education and training. The paradox is in part resolved when new jobs that are created (and tend to require more education) are distinguished from existing jobs that will require replacements (and reflect existing needs for skills and education). This doesn't necessarily mean the "good jobs" are necessarily the new occupations requiring higher education, even though they are indeed likely to pay much better than the jobs requiring little education. The new jobs may be particularly vulnerable to being shifted abroad, or "off-shored." Section VI introduces ways of rooting new jobs in Indiana and ways to protect them from off-shoring, which will make it even more essential to be able to bring the right workers to the state.

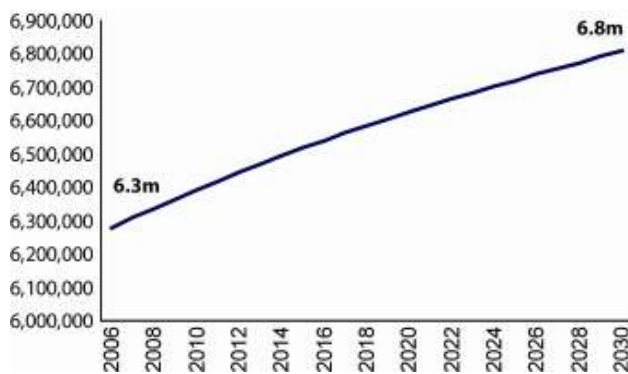
Section VII concludes by raising some of the educational issues that will form the bases of the project's next two Working Papers. Put quite simply, some groups of immigrants are, on average, much better educated than US-born Hoosiers; others, on average, have much less education. One challenge is to avoid creating a multi-generational ethnic underclass of poorly skilled and under-educated workers. To increase the competitiveness of Indiana's highest value-added industries the state must attract as many college-educated immigrants as possible, which will mean providing world-class educational opportunities for their children. Doing both is still possible, though time is short and the challenge is daunting.

## II. The Demographic Crunch

### Indiana's Population Projection Baseline

Like the rest of the developed world, Indiana faces a demographic crunch, a steadily aging population far into the future. As Baby Boomer retirement gathers steam, labor force growth in Indiana will slow, then cease, and eventually go into decline. A reasonable estimate of the future labor force projects a peak in 2020, followed by a decade of contraction resulting in a labor force in 2030 roughly the size of its level in 2012. The prediction for Indiana's population shows a gradual deceleration through 2030, with a slightly slower level of continuous absolute increase after the 2018 period. This is shown in Figure II-1.

Figure II-1. Total Indiana population, 2006-2030.<sup>4</sup>



The official projection of approximately 500,000 additional persons to Indiana's population over the next quarter-century represents a significant slowdown in growth compared to the addition of the most recent half-million people, which occurred in only ten years. During this time period, the state's population becomes much older. The age projections for 2006 estimate that 12 percent of the population will be 65 or older. Estimates predict that by 2030, the

65 and older cohort will represent more than 18 percent of the population.<sup>5</sup> In an assumption about labor force growth that holds participation rates constant, the movement of Baby Boomers into ages with lower work propensities depresses labor force growth.

***If the state hopes to avoid the most painful trade-offs, it must understand inexorable population constraints as well as open policy choices.***

The implications of such a future are worrisome: severe pressure on economic growth, persistent public budget crises, a perpetual temptation to sacrifice resources supporting long-term growth—such as education funding—in favor of entitlement programs for retirees, and other policy challenges. A wit might call this future “Geezer Wars,” but the policy struggles will be quite serious. Providing a framework to anticipate this strategic change requires a detailed understanding of baseline population and labor force projections that clarifies the links between slowing population and labor force growth, aging, and immigration.

Indiana is not alone in facing this demographic crunch. States that manage to avoid a dark future will have given priority to economic growth in their development strategies. There are two broad elements of success: more workers and more productive workers. The successful states will be those that maximize the education and skills of their workforces. They also will have taken steps to add to their labor force populations through programs to reduce full retirement behavior among Baby Boomers, as well as favorable policies toward bringing in new workers. Some of these new workers will be immigrants, which leads many who are nervous about waves of the foreign-born overwhelming their communities to focus on increasing the size of the post-retirement workforce.

***The hope that Baby Boomers will remain in the workforce past retirement age runs counter to Boomers' expectations and even under the most optimistic of assumptions post-retirement workers will not significantly ease Indiana's demographic crunch.***

Will Baby Boomers refuse to leave the workforce after reaching retirement age, or will their retirement behavior mirror the behavior of today's retirees? Some factors could make Boomer retirement quite different from that of earlier eras. "Retirement" is not a biological given, and in fact the very concept barely existed prior to the mid-20th century. Instead, cultures tended to associate aging more with declining quantity of work rather than outright cessation. If the next decades reformulate the notion of retirement into a life-extended version of the work draw-down practiced by almost all preceding generations, it will be due to the unique characteristics of the Boomers. This is the first generation to command the information economy, which imposes low physical demands on many workers. Plus, many Boomers have significant wealth resulting from work-related benefits contributions, which sustains them in their retirement. They are by far the most educated generation up to their time, giving them potentially greater flexibility in starting new, secondary or partial careers.

One must view these caveats with skepticism, however. While past generations may have only partially retired, the Baby Boomers would certainly be the first generation to stay in the workforce willingly. All observed participation rates throughout the developed (and less developed) world show a clear and significant desire to exit the workforce that begins around the age of 55. After all, retirement security was one of the first aims of the developed world's social safety nets. And this generation has proven itself a most potent voting bloc, so it is unlikely to have changes in the legal framework of retirement foisted unilaterally by a democratically elected government. Perhaps more importantly, there is evidence of under-appreciated socio-biological factors that could preclude a significant extension of the working life of most older adults.<sup>6</sup>

***Indiana will have to attract productive workers to the state—somehow.***

As policymakers cannot rely solely on increasing the participation rates among older adults this means that policymakers must find ways to increase the size of the Indiana's population to maintain healthy labor force growth into the medium- and long-term future. There are two strategies to increase the population: attract workers from other states (as a subset, convince Hoosiers who might likely leave the state that they should remain); and/or attract foreign immigrants.<sup>7</sup> While not every strategy will accomplish both, the most successful strategies will, and the danger of bad strategies is that they might achieve neither an inflow of native-born workers nor an inflow of properly prepared and productive immigrants.

The stakes are even higher than the population projections in the next section imply. State-level population projections suffer from an elementary problem: States' population growth correlates with their economic growth. Where and when opportunity is present, people move to take advantage of it. Where and when opportunity wanes, people leave for better circumstances elsewhere. This means that the effects of successful policies may be even greater than the models predict, and the consequences of failure even worse. If measured by per capita income, the perception of economic opportunity is admittedly not the only determinant of migration behavior. Americans' evident preference for warmer weather would be an example. Still, per capita income explains a good deal of state-level population growth.

### III. Do Workers Follow Jobs, or Do Jobs Follow Workers? Patterns of Immigrant Settlement and Economic Growth in Indiana

***Indiana's population has a relatively low but rapidly growing share of immigrants.***

Immigrants make up a much smaller share of Indiana's population than in the country as a whole.<sup>8</sup> While twelve percent of the population of the United States (US) was born elsewhere, only four percent of Indiana's population is foreign-born, ranking the state 35<sup>th</sup> among the 50 states and the District of Columbia. On the other hand, the state ranks 12<sup>th</sup> in the percent change of its foreign-born population since 2000: this population grew almost 30 percent from 2000-2005, compared to a growth of the foreign-born population for the US as a whole of 16 percent during this period.

While Indiana may not yet be a magnet for foreign nationals, it is attracting residents born in all corners of the world. Unfortunately, much of the strident and shrill discussion of immigration in Indiana comes from Hoosiers who see their communities washed over by waves of newcomers from Mexico and Central America. As Appendix 1 indicates, the real picture is more complicated. The data in Appendix 1 and Figure III-1 show an immigrant population with a more complex composition than the popular image of a tsunami from south of the border.

**Figure III-1. Absolute and percentage change in the foreign-born population, 2005, by continent and sub-continent of origin.<sup>9</sup>**

Origin	2005 Population	Absolute Change	Change Rate
Total	242,281	55,747	30%
Europe	41,360	-1,945	-4%
N Europe	7,465	-1,307	-15%
W Europe	11,403	-1,974	-15%
S Europe	3,460	-748	-18%
E Europe	18,899	1,987	12%
Asia	59,864	10,251	21%
E Asia	26,060	7,066	37%
S-Cent Asia	14,904	2,602	21%
SE Asia	15,271	726	5%
W Asia	3,629	158	5%
Africa	12,319	5,011	69%
E Africa	5,261	2,980	131%
Mid Africa	815	522	178%
N Africa	1,577	311	25%
S Africa	669	50	8%
W Africa	3,213	936	41%
Oceania	859	-126	-13%
Americas	127,879	42,561	50%
Caribbean	4,592	991	28%
Cent Amer	108,765	40,310	59%
S America	7,295	1,894	35%
N America	7,227	-634	-8%

Latinos/Hispanics<sup>10</sup>—and particularly Mexicans—are indeed the single most common type of immigrant. With nearly 100,000 Mexican-born residents and another 16,000 from other Central and South American nations—as well as a combined growth rate of over 50 percent in a five-year period—the Latino/Hispanic presence in Indiana is substantial.

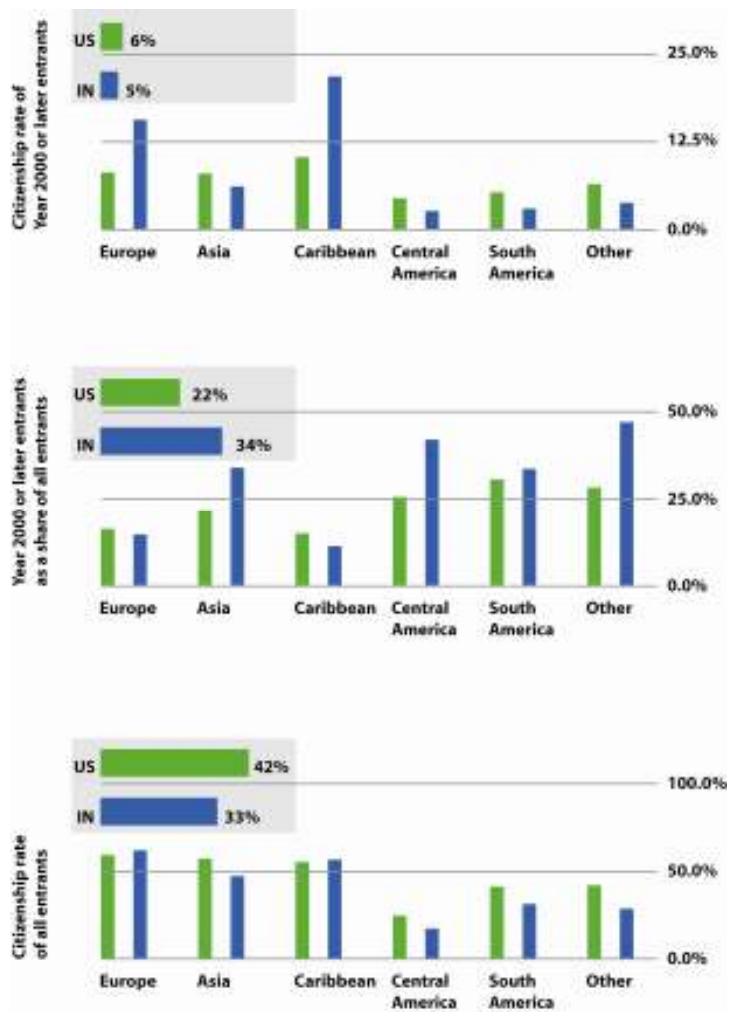
However, as of the latest data in 2005, Latinos/Hispanics did not represent a true majority of Indiana immigrants. This is in contrast to the US as a whole, where 53.3 percent of immigrants are from Latin America. In Indiana, 49.8 percent of immigrants are. No doubt, the growth rates shown in Figure III-1 have made Latinos/Hispanics a majority of Hoosier immigrants by 2007; but it is

unlikely that their share of the immigrant population here will have caught up with their national share.

A foreign-born member of Indiana's population is less likely to be a citizen than a typical US immigrant, as one can gather from the information outlined in the bottom panel of Figure III-2, which explains that 42 percent of all US immigrants earned their citizenship, but only 33 percent of Indiana immigrants did.



Figure III-2. Citizenship of the foreign-born, 2005, with various measures.



This is not to say that Indiana's immigrants are particularly reluctant to seek US citizenship or to assimilate in other ways. The chief cause of the lower citizenship rate is the relatively recent entry of Indiana immigrants. This is shown in the middle panel of Figure III-2. More than one-third of immigrants here entered the US in 2000 or later. Only 22 percent of all American immigrants are so new.

Unsurprisingly, since earning citizenship takes time, newer immigrants are the least likely to be citizens. This is not the only factor driving lower citizenship rates among Hoosier immigrants. Among the fastest growing immigrant cohorts—Asians, Africans, and Central Americans—2000 and later immigrants in Indiana are slightly less likely to be citizens than is true in the rest of the US. However, the most important factor is that Indiana has only

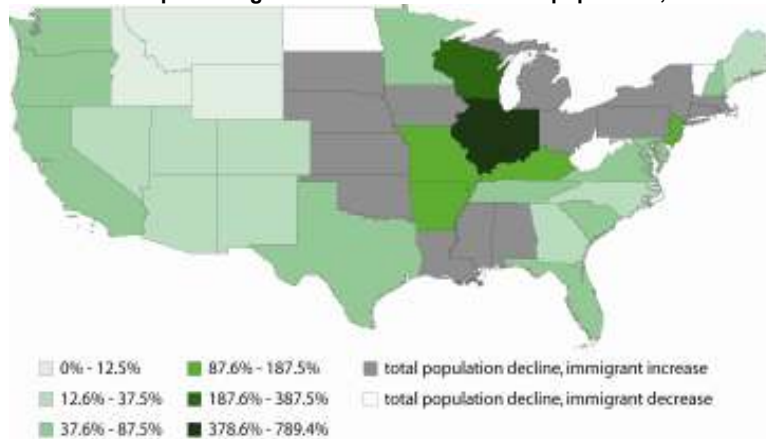
recently become a destination state for large waves of immigration compared to states in the Northeast and Southwest.

***Immigrants drive Indiana's total population growth more than in most other states.***

Indiana is more dependent on immigration for total population growth than is most of the country, as Figure III-3 underscores.

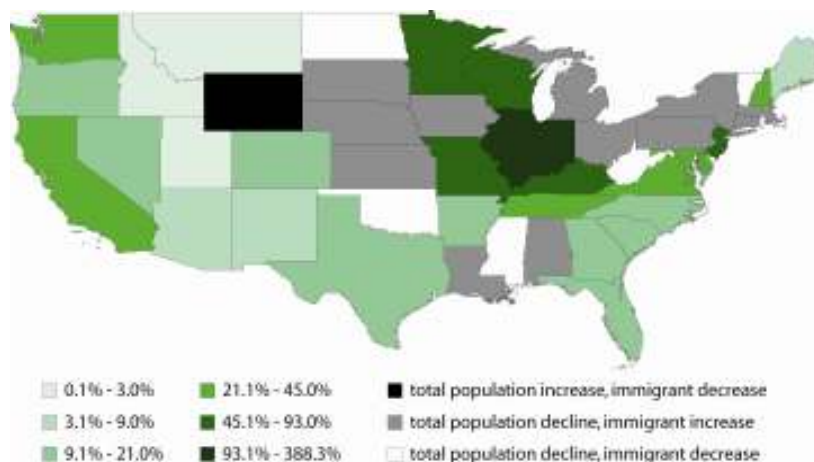
Estimates reveal that seventeen states and the District of Columbia have lost population since 2000. For the sake of its economy, Indiana was fortunate not to be one of them. Among the states that are growing, Indiana is heavily reliant on the new waves of immigration. The absolute increase of the foreign-born population was 433 percent the size of the absolute increase in the total population. Among states with an increasing population, only Illinois was more dependent on immigration to drive growth than was Indiana. To be sure, one could presume that those states shaded gray in Figure III-3—those that lost population—are in a sense more reliant on immigrants. Yet, theirs would seem a different policy context. In such states, immigration is not enough to create total growth. In Indiana, Illinois, Wisconsin, Kentucky, New Jersey, and Missouri, immigration is the source of total growth.

**Figure III-3. Increase in the foreign-born population as a percentage of the increase in the total population, 2000-05.**



Indiana's dependence on immigration for total population growth is not only a function of new Latino/Hispanic immigrants. Figure III-2 shows the rapid increase of Asian and African immigrant populations. Figure III-4 shows the degree to which they are contributing to Indiana's overall population change.

**Figure III-4. Increase in the non-Latin American foreign-born population as a percentage of the increase in the total population, 2000-05.**



Again, Indiana is second only to Illinois in the ratio of 2000-05 immigrant change (in this case among non-Latin American immigrants) to total population change. Figure III-4 also demonstrates just how much the entire Midwest now depends on immigration. Only New Jersey's population

change approaches the degree of dependence on non-Latin American immigration that characterizes Indiana and Illinois, as well as Wisconsin, Minnesota, Missouri and Kentucky.



***Migration of native-born Americans from the Midwest and Northeast to warmer climates is opening opportunities for immigrants—and should continue into the future.***

The root cause of the patterns found in Figures III-3 and III-4 is the evident out-migration of domestic-born residents of the Midwest and Northeast. Indiana, for example, ranks 20th in the size of absolute immigration growth and 26th in the size of absolute non-Latin American immigration growth, despite ranking second in its reliance on immigration to drive total growth.

Are the two issues of domestic out-migration and inflow of immigrants related? It is often correctly suggested that immigrants come to the US to do the work Americans do not want to do (or at least not at the wages employers are willing and able to pay). It also appears that immigrants are willing to live in places where fewer Americans now want to live. An important fact about US population trends is that growth is correlated with temperature. A survey of metropolitan growth drives this point home. Between 2000 and 2005, of the twenty fastest growing major metropolitan areas (i.e., those fifty with a population of more than one million), only Denver and Indianapolis are not at least partly in the Old Confederacy, the Southwest, or the West Coast. Of the twenty slowest growing major metropolitan areas, only New Orleans, San Francisco, San Jose, and Birmingham are in the Old Confederacy, the Southwest, or the West Coast.

What fuels this process? Workers move where economic opportunity exists. But in an economy in which human capital is the most important resource, economic opportunity and growth also follows workers. A growing body of evidence shows that Americans are increasingly inclined to base their choice of residence on lifestyle preferences, then find a job afterward. This seems particularly the case with the highly mobile and talented workers that comprise Richard Florida's "Creative Class,"<sup>11</sup> but it seems true of other workers as well. Whether this national trend ever reverses itself, the growth of Indianapolis and Denver does suggest the advantages of the warmer latitudes are not the only ones that matter.

It may also be that US- and foreign-born behavior continues, as in the recent past in Indiana and the Midwest. In this future, immigrants may fill the vacuum left by the domestic-born who migrate to the South and West but not much more. This future would look like Figures III-3 and III-4. This is just one possible growth trajectory, however. To distinguish it, call it Demographic Scenario I.

***Domestic out-migration from the Northeast and Midwest could be reversible—if the sort of strong economic growth that revived many cities in the 1990s and the region's robust knowledge infrastructure generate hyper-competitive industry clusters.***

Consider a possible future in which the rates of domestic out-migration turn back to the Midwest's and Northeast's favor with continued dynamic flow of foreign-born into the state. This would not mean immigrants stop coming to the state because they see fewer vacancies left behind by departing native-born workers. Immigrants are drawn to these states for reasons besides the domestic population flocking to warmer climates to the south and west. In addition, communities of newcomers often reach a "tipping point," a critical mass at which the economic and cultural environment encourages more immigrant-specific entrepreneurial activity. Information about job opportunities increases. As was true of Latino/Hispanic immigration in the Southwest a few decades ago, the immigration levels that Illinois and Indiana are now experiencing may be just starting to take off.

If future domestic migration behavior does reverse and the population growth of Indiana's native-born population accelerates, recent immigration levels on total population growth could have a great impact. Barring even greater climate change in the next two decades than eco-

pessimists foresee, any return to positive domestic migration rates in the Midwest and Northeast will be due to new economic opportunity. There is precedent for such a dramatic turn-around. The 1970s and 1980s witnessed an evisceration of urban cores, hammered by population loss and recession. The dynamic information economy led many to rebound during the 1990s.

An external and internal tipping point that could change the fortunes of the Midwest would be its knowledge infrastructure, which is far healthier than is generally appreciated. As a result of the concentration of major research universities such as those in the Big Ten, “Great Lakes states produced 38 percent of the country’s bachelor’s degree holders, 36 percent of all science and engineering degrees, and 37 percent of all advanced science and engineering degrees in 2003—far outstripping any other region of the country.”<sup>12</sup> The production of degrees has its parallel in research and development expenditures. Among Census Bureau geographic divisions, total R&D expenditures are greater in the East North Central Division (Illinois, Indiana, Michigan, Ohio, and Wisconsin) than any except the Pacific Division (Alaska, California, Hawaii, Oregon, and Washington).<sup>13</sup>

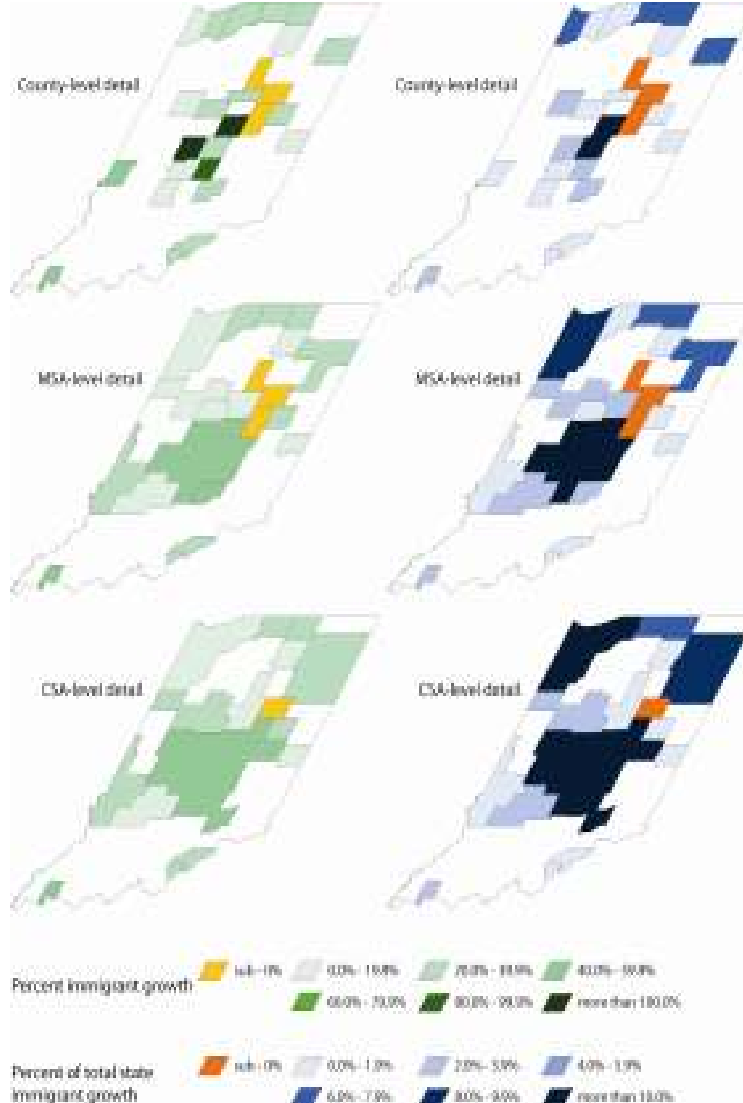
Hyper-competitive industry clusters in Indiana and the rest of the Midwest (the life sciences being the most likely candidate in Indiana) could reverse the out-migration of recent years. The result could be much faster growth than Indiana policymakers have come to expect. The increased economic opportunity that defines this scenario would almost certainly be associated with increased international migration as well. In a sense, foreign-born immigrants now function as life support to Indiana’s total population growth. Strong domestic in-migration would make foreign-born immigrants the equivalent of enriched oxygen to a suddenly healthy patient.

***In Indiana, the demographic crunch could draw even more immigrants to Indianapolis and its neighboring counties, reinforcing existing urban clusters of economic vitality.***

Immigrant-friendly policies—integration into the community, education, and job training, and so on—ironically could be more likely if the flow of non-immigrants out of Indiana reverses itself; that is, if an increasing flow of foreign-born workers is less essential to the state’s economic well-being. Increased domestic in-migration will happen only with stronger economic growth, which will reduce the resentment caused by the rapid population change. An expanding economic pie is always easier to slice. There will be fewer accusations (baseless or not) that immigrants are “crowding out” native-born Hoosiers. Moreover, the economic growth in this scenario would be much more influenced by immigrant activity. The economic contribution of immigrants and their greater numbers would give them relatively more political capital. The other scenario would be associated with more anemic economic growth and leave Indiana vulnerable to the type of backlash against immigrants that has been seen before in times of reduced economic opportunity.

The biggest magnet in Indiana for foreign immigration is thus the same as the state’s biggest magnet for domestic migration: Indianapolis and its surrounding metropolitan area. The rough trends are sketched by Figure III-5.

**Figure III-5 Percent growth and percent of total state growth of immigrant populations, 2000-05, by county, metropolitan statistical area, and combined statistical area.**



major transportation routes. This suggests the patterns of Figure III-5 are a good base upon which to form future expectations: relatively rapid immigrant growth along the Chicago-to-Fort Wayne combined statistical area (CSA) and Chicago-to-Lafayette CSA corridors. Nearly 45 percent of Indiana's foreign-born population lived in those counties in 2005. Between 2000 and 2005, growth rates reached 34 percent in LaPorte County, 33 percent in Elkhart County, 28 percent in St. Joseph County, with lowest growth rate occurring in Kosciusko County. In all, more than one-third of the 2000-05 increase in Indiana's immigrant population occurred in the northern and Chicago-to-Indianapolis corridors shown in Figure III-5.

As such, the effect of large cities' growing dynamism upon immigrants is fairly the same as their effect upon the domestic population. Major cities produce the jobs. Immigrants respond predictably. There is little reason to expect that this will change in the future in any kind of general way. Certain types of economic growth may affect the degree of urban attraction upon immigrants, but the structural underpinnings are likely to remain the same.

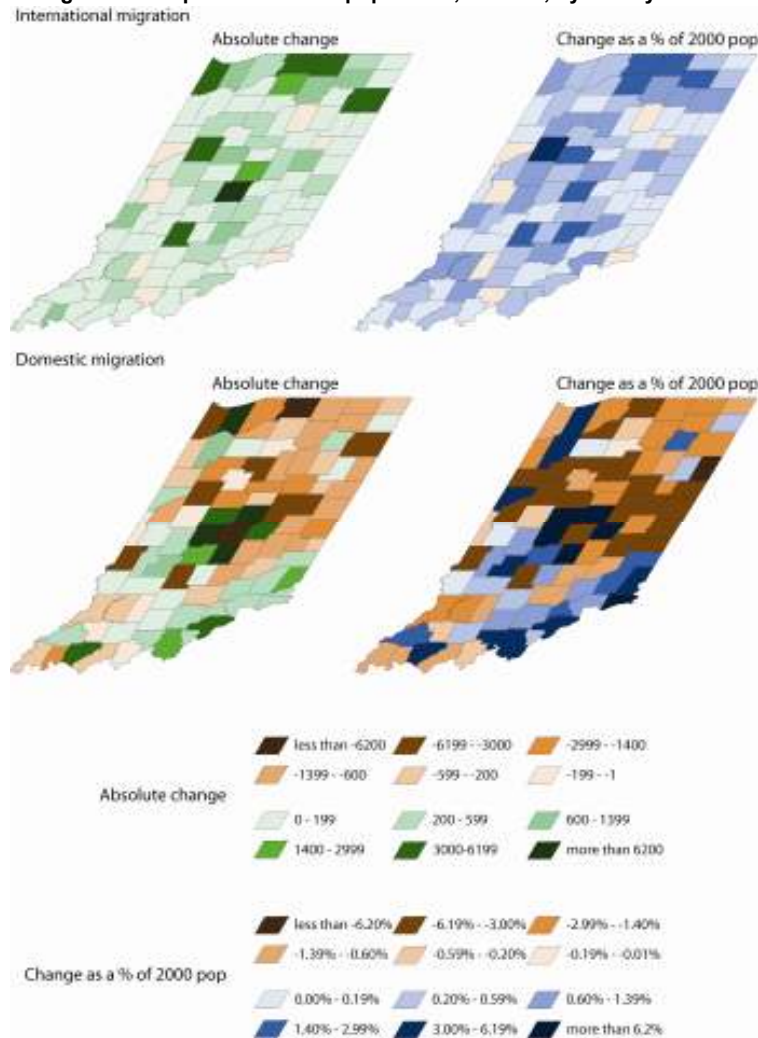
The most stunning growth, however, occurred within the Indianapolis area. There are two definitions of Indianapolis that can describe its "area." These are the "Combined Statistical Area," which is shown in the bottom-most row of maps in Figure III-5, and its subset, the "Metropolitan Statistical Area," which is shown in the middle row. As 97 percent of growth in the CSA's foreign-born population occurred in the MSA, the difference between the two geographies with respect to immigration is minimal.<sup>15</sup>

As of 2005, slightly more than one-third, 36 percent, of Indiana immigrants resided in the Indianapolis CSA. However, slightly more than one-half, 51 percent, of 2000-05 growth in the total Indiana foreign-born population occurred within the Indianapolis CSA. This was a result of a spectacular growth rate of roughly 50 percent over the five-year period. In other words, Indianapolis is beginning to swap places with the northern and Chicago-to-Lafayette corridors as the chief draw in Indiana for the foreign-born. Whereas the latter has been the stronger historical magnet—and still hosts the larger immigrant community—the dynamism of Indianapolis makes it the stronger magnet, at least currently.

*In northern Indiana and the northwest-to-central corridor, domestic out-migration is balanced by growing immigration, while the southeastern and south-central parts of the state see positive domestic migration with relatively low growth of immigration. Only Indianapolis and its neighboring counties attract strong domestic in-migration and even stronger inflows of immigrants.*

Figure III-6 examines statewide immigration. It shows behavior by two mobile groups—domestic and international migrants—along two dimensions—total change and change as a percentage of the Year 2000 population in each county.<sup>16</sup>

**Figure III-6 International and domestic migration absolute change and as a percent of 2000 population, 2000-05, by county.**



The northern and northwestern-to-central portions of the state are the chief recipients of its immigration. However, Figure III-6 highlights the other side of this issue. The new waves of immigration accompany significant outflows of domestic residents in much of Indiana. Most of the northern sections of the state and central portions of the state, with suburban exceptions, are shedding domestic-born residents at very high rates.

In northern Indiana strong international migration is not enough to offset domestic out-migration to generate significant regional population growth. In the southeastern and south-central parts of the state, positive net domestic migration is not so strong as to effectively generate regional growth in the absence of high international in-migration. In central Indiana, the strength of urban areas as

attractions for mobile domestic populations, along with explosive immigrant growth, creates the state's most significant driver of demographic change.

As we noted, the emergence of a relatively statewide hyper-competitive cluster (such as life sciences) would generate very rapid population growth due to the new immigration. Continued strong immigration levels, combined with a sudden surge in domestic migration, would create a demographic dynamic new to the state as a whole. Figure III-6 shows how this dynamic would closely mirror the fundamentals behind population change in the Indianapolis metropolitan region. The fact that this growth is very much rooted in an emerging competitiveness of its key

global industry clusters is no coincidence. The result, as described earlier, is one of the two fastest growing “cold state” major metropolitan areas. In the event of such a scenario, immigration will not just be an external, combinatory trend, however. The raw labor force injection it provides, as well as the increased human innovation and cutting-edge knowledge, will be keys to any sort of desirable future.



## IV. Pick Your Path to Prosperity: Two Geographic Futures for a Growing Indiana Economy

### *Specific industry clusters driving Indiana's economic growth will lead to particular geographic clustering.*

State economic development policy and workforce-development policy are targeted to specific industry sectors<sup>17</sup> as policymakers increasingly draw from the work of Michael Porter on “industry clusters”<sup>18</sup> to view workforce and economic development as interconnected strategically and geographically. In order to meet its goal of per capita income and average wages in Indiana reaching the national average by 2020, the Indiana Economic Development Corporation’s Strategic Plan—dubbed “Accelerating Growth”—identifies eight industry-, sector-, or cluster-specific initiatives: advanced manufacturing, agriculture, film, information technology, insurance, life sciences, logistics, and motor sports.<sup>19</sup>

Each of these eight initiatives, if competitive, promise wages that could help achieve the IEDC’s goal by 2020. But while policymakers care about raising per capita averages, individuals care more about the distribution of gains. The geographic pattern of future prosperity is likely to be different, however, depending on which of the industries above ultimately drive the state’s growth. Some of the industries identified rely on large metropolitan areas for vitality; others can flourish across a broader geographic footprint. Which path the state follows depends on many factors outside Hoosier control—success or failure of competing cities, the health of the global economy, technological breakthroughs on the other side of the planet, and so on. That makes the choices that are in our hands even more significant.

### *Most—but not all—of tomorrow’s promising industries will clump together in large metropolitan areas and advanced manufacturing might flourish along “super cities” following Interstate corridors.*

Consider four examples as outlined in Figure IV-1, which examines industry trends for advanced manufacturing, life sciences, logistics, and motor sports, as defined by the Indianapolis Private Industry Council.<sup>20</sup>

**Figure IV-1. The Indianapolis MSA’s share of total establishments and total employment in three-digit NAICS industries containing specific advanced manufacturing, motor sports, life sciences, and logistics industries, first quarter 2001 and first quarter 2006.**<sup>21</sup>

	Establishments		Employment	
	Q1-01	Q1-06	Q1-01	Q1-06
Adv. manf.	17.6%	19.9%	13.4%	12.9%
Motor sports	26.9%	27.5%	21.3%	23.2%
Life science	29.7%	31.1%	27.5%	28.6%
Logistics	39.5%	39.9%	39.5%	39.9%

Employment and firm creation tend to accumulate in major metropolitan areas, the primary spaces encouraging crucial formal and informal exchange of information and the kind of labor market fluidity the new economy requires. Workers and firms who generate information and are under intense pressure to innovate have strong incentives to locate in cities.

The Indianapolis Metropolitan Statistical Area increased its share of total state establishments and employment in the industries analyzed, with one exception: its share of total employment in industries associated with advanced manufacturing declined. Advanced manufacturing is sometimes defined by smaller and more flexible knowledge-intensive shop floors, so the declining employment share might not be permanent. Indeed, in the Indianapolis MSA, average

weekly wages for these advanced manufacturing industries was 108 percent of the state average in the first quarter of 2001; by the first quarter of 2006, the gap increased to 114 percent of the state average.

Nonetheless, Figure IV-1 reflects the fact that due to property and other costs, manufacturing firms are more likely than those in other sectors to seek out sites some distance from major metropolitan areas. One must not take this principle too far. The new economy still shapes new manufacturing locations, depending on access to Interstates and just-in-time delivery routes. Think of manufacturing location in terms of a geographic entity increasingly called “super cities,” such as the I-35 corridor between San Antonio and Kansas City.<sup>22</sup>

With Interstates crossing nearly every section of Indiana (except its mid-north-central and most of its southwest regions), an expansion of advanced manufacturing employment could generate population growth (and new education and training needs) in communities throughout the state. Many different dynamics could shape the geographic distribution of advanced manufacturing employment in Indiana, and the very highest-paying advanced manufacturing jobs will probably concentrate in Indianapolis—but it is likely that the distribution would be across Indiana’s Interstate corridors.

For the other industries targeted by the IEDC, the logic of the new economy works against non-metropolitan areas. If Indiana returns to prosperity as a result of a resurgence of manufacturing, many areas in the state may reverse their recent population declines. But if prosperity is built on the other industry sectors, the divide between population growth in Indianapolis and the rest of the state is likely to accelerate.

Whether growth comes from widely distributed manufacturing or from metro-clustered industries, population change is likely to be “give-and-get” for most Indiana cities. Figure IV-2, showing the 1995 origins of Indiana residents in the year 2000, reveals a clear trend: nearly every Hoosier metro- or micropolitan area<sup>23</sup> greater than 50,000 lost population to the Indianapolis MSA; however, many offset their losses to Indianapolis by gaining population from surrounding areas and the other three major metro areas overlapping the state (Chicago, Cincinnati, and Louisville).

**Figure IV-2. Net migration with Indianapolis and non-Indianapolis areas, by metro or micro, 1995-2000.**<sup>24</sup>

	Indianapolis	Non-Indianapolis
<i>Gaining from both Indianapolis and non-Indianapolis areas</i>		
Bloomington	2,706	3,105
Lafayette	111	6,051
<i>Losing to Indianapolis but gaining from non-Indianapolis areas</i>		
Terre Haute	-1,035	63
Muncie	-1,103	2,103
Fort Wayne	-1,502	4,230
South Bend	-1,465	1,497
Michigan City	-569	2,270
Evansville	-544	1,287
Warsaw	-569	2,117
Richmond	-667	511
Jasper	-154	660
<i>Losing to both Indianapolis and non-Indianapolis areas</i>		
Kokomo	-401	-257
Anderson	-718	-411
Columbus	-463	-206
Elkhart	-569	-829
Marion	-831	-1,331
Chicago	-7,386	-17,751
Cincinnati	-10	-1,865
Louisville	-67	-1,443
Indianapolis	n/a	16,922

There are only two cities able to compensate for their losses to Indianapolis through gains from elsewhere that are not along Interstates: Jasper, where available wages dwarf those of its surrounding rural counties; and Warsaw, home to a thriving biomedical manufacturing sector. The two cities posting a positive 1995-2000 net migration relation with Indianapolis—Bloomington and Lafayette—are home to the state’s two largest universities, as they are talent magnets in the new economy.

***Increasing economic and population growth outside Indianapolis will require changes in education and training that shift costs and risks from firms to the public.***

Given that the 1995-2000 data indicate patterns of growth and the prospects for a prosperous future based on booming advanced manufacturing, the implications for education and training are significant. If these needs are not met, the 1995-2000 patterns might not be relevant to future expectations, and Indiana’s smaller cities will lose their ability to develop and attract skilled and competitive workers.

Spreading economic growth across the state requires policymakers to confront one of the most important challenges that follow when regions try to tap into the New Economy benefits that most large metropolitan areas enjoy: providing for ongoing education, training, and retraining.

Educating and training workers in the 21<sup>st</sup> century is expensive and risky. Employees can take their newly acquired skills, paid for or subsidized by their employer, to a better paying offer. The wise firm seeks ways to spread either the risk or the cost across its labor market competitors. In large cities, this risk is spread by the very nature of urban size and its translation to a critical mass of workers. A firm in a larger city may be at risk of losing a newly trained

employee to a competitor, but this is offset by the increased ability to acquire the requisite skilled employees of the many other firms in a large city.

Spreading risk this way is not possible in smaller metropolitan areas. As ever higher levels of workforce skill and knowledge become necessary, the alternative is to find more effective means of sharing the costs of education and training across firms. This inevitably points toward public or subsidized private education providers that can spread fixed costs across many firms and smooth the booms and busts of the training needs within individual firms. Manufacturing employers today call for more non-degree, technical post-secondary workforce training. Many people attribute this demand to the increased sophistication of the modern workplace or shop floor, an explanation that, while correct, misses differences between smaller and larger metropolitan areas.

***No matter which pattern economic growth follows, today's system of education and training will be strained.***

Growth driven by industries concentrated in Indianapolis (and to a lesser extent Chicago, Louisville, and Cincinnati) requires more effective workforce training institutions to *increase* Indiana's competitiveness. A resurgence of advanced manufacturing in the state's non-major metro areas, on the other hand, requires more effective workforce training institutions to *maintain* Indiana's competitiveness. The two different possible demographic futures will shape the optimal structure of Indiana's education and training system. For instance, a more geographically distributed, advanced, manufacturing-enabled sort of economic growth will increase the importance of non-traditional delivery and course sequencing arrangements rather than those offered by the existing, degree-oriented and campus-centric model.

Rapid population growth will require more post-secondary desks and whiteboards, whether real or virtual. Moreover, future students will be increasingly different than college students of the past. They will increasingly be first- or second-generation immigrants. Tapping the potential of newcomers to the US is a prerequisite for long-term growth, but it is even more challenging than it would superficially appear. As Section II explained, Indiana's new immigrants come from across the world. Section VII addresses a further distinction—the growing reality that the educational attainment of immigrants and their families is extremely bifurcated, to the point that there are two worlds of immigrant education in Indiana.

## V. The Future of Jobs in Indiana: Projections of the Occupational Composition of the Workforce

*“Stay in school” and “increase your skills” may be wise advice, but making sound policy requires carefully looking at a future that is fuzzy—and yields a picture of Indiana’s future jobs and education that may seem dense and confusing.*

Observers of all political, economic and geographic backgrounds agree that the global economy increasingly rewards those with high levels of skills and knowledge and punishes those without. But we need more than just sound advice for individuals. Broad maxims ignore the simple reality that not every 16-year-old has the wherewithal to attain a graduate degree. Not every 46-year-old has the ability to rapidly absorb wholly new skill sets. Policymakers must make painful trade-offs about how to use scarce public funds. A more informed understanding about the future of the jobs that will define Indiana’s economy can allow policymakers to confront macroeconomic trends with a practical response.

Projecting the future is messy, *quantifying* the future is messier still—and messiest of all is deciphering what these quantifications of the future mean for present-day policymaking. The standard tool for analyzing the future workforce is official government projections about occupations, but these projections have limitations.<sup>25</sup> They rely on a base year that is necessarily some distance in the past. For example, the most up-to-date projections are currently for the 2004-2014 time period. In addition, such a projection carries the risk of becoming even more outmoded because only the base year (2004) and final year (2014) are reported. Unavoidable “rounding” in the data further affects their precision. Most importantly, the economy is far too dynamic to continue uninterruptedly following past trends. As often as not, official projections totally miss the most rapidly growing jobs. In many cases, the fastest growing occupations did not even exist ten or twelve years before.

Let us cut to the end of our analysis, then carefully walk through the process of how this picture was obtained. The best available education and training data seem to suggest seven main conclusions:

- 1) Future job growth will be associated with substantially higher levels of education,
- 2) Future job growth will be associated with slightly lower levels of related experience,
- 3) Future job growth will be associated with slightly lower levels of necessary training,
- 4) Future total job openings will be associated with slightly less high school diploma attainment and postsecondary certification,
- 5) Future total job openings will be associated with roughly equivalent levels of postsecondary degrees but with slightly higher levels of *minimum* moderate-term postsecondary education needs (postsecondary certification, associate’s degrees, and bachelor’s degrees),
- 6) Future total job openings will be associated with substantially lower levels of related experience, and
- 7) Future total job openings will be associated with slightly lower levels of necessary training.

Note the distinctions: between job growth and job openings; and between education, training, and work experience. These are important, which this paper will further address below. Reduced to seven main conclusions, this picture seems counterintuitive, especially with respect to total future job openings. The dimension of job growth comes close to supporting what most experts conclude about the need for more education. Yet in terms of experience and training, future job growth will apparently be diluted relative to the needs of the past. The dimension of total job openings does not at all come close to supporting the conventional wisdom about more education being essential. The education associated with future job openings includes a greater share of jobs that high school dropouts can fill, the same percentage that graduate-degree holders can fill, and only a slightly higher percentage that those with less advanced college

attainment can fill. The experience and training associated with future job openings will be substantially less than what is associated with the present. To understand the details of our picture of workforce needs, let's examine changes to major occupational groupings, shown in Figure V-1.

**Figure V-1. Net occupational change by major occupational grouping.<sup>26</sup>**

	2004 emp	2004-14 absolute	2004- 2014 rate	2004 share	2004-2014 growth share
Total	3,056,560	302,610	9.9%	100.0%	100.0%
(1) Management	140,200	18,670	13.3%	4.6%	6.2%
(2) Business & financial operations	97,130	14,620	15.1%	3.2%	4.8%
(3) Computer & mathematical	37,750	10,020	26.5%	1.2%	3.3%
(4) Architecture & engineering	51,140	6,200	12.1%	1.7%	2.0%
(5) Life, physical, & social sciences	19,950	3,100	15.5%	0.7%	1.0%
(6) Community & social services	25,950	5,670	21.8%	0.8%	1.9%
(7) Legal	14,800	2,470	16.7%	0.5%	0.8%
(8) Education, training, & library	157,420	28,840	18.3%	5.2%	9.5%
(9) Arts, design, entertainment, sports, & media	38,650	4,710	12.2%	1.3%	1.6%
(10) Healthcare practitioners & technical	157,440	37,810	24.0%	5.2%	12.5%
(11) Healthcare support	66,880	19,300	28.9%	2.2%	6.4%
(12) Food preparation & serving related	251,640	28,090	11.2%	8.2%	9.3%
(13) Building & grounds cleaning & maintenance	101,040	17,370	17.2%	3.3%	5.7%
(14) Personal care & service	77,130	12,760	16.5%	2.5%	4.2%
(15) Construction & extraction	169,110	19,500	11.5%	5.5%	6.4%
(16) Sales & related	312,910	10,680	3.4%	10.2%	3.5%
(17) Office & administrative support	451,160	13,560	3.0%	14.8%	4.5%
(18) Protective service	55,480	4,950	8.9%	1.8%	1.6%
(19) Farming, fishing, & forestry	10,120	300	3.0%	0.3%	0.1%
(20) Installation, maintenance, & repair	139,810	13,200	9.4%	4.6%	4.4%
(21) Production	403,990	7,410	1.8%	13.2%	2.4%
(22) Transportation & material moving	271,440	22,380	8.2%	8.9%	7.4%

In short, Figure V-1 shows five dimensions of data:

- The first column is total employment in 2004.
- The second column is projected growth by occupation 2004-14
- The third column is the rate of 2004-14 projected growth.
- The fourth column shows the share of total employment represented by each occupational grouping in 2004.
- The fifth column shows the share of 2004-14 growth.

A comparison between the fourth and fifth column shows which occupational groupings are expected to contribute a larger share of employment growth than their original share of static Year 2004 employment, and which are expected to contribute a smaller share of growth than their original share of employment.

The state predicts that 15 of the 22 occupational groupings will contribute a larger share of growth in the years ahead than their original share of employment (in Figure V-1, the first 15 occupational groupings). The considerable spread between share of future growth and share of 2004 employment among the occupational groupings that are losing their claim on the US workforce is made possible by the large number of occupational groupings projected to gain.



The biggest difference is in production occupations (21). These represented 13.2 percent of employment in Indiana in 2004. They are projected to claim only 2.4 percent of growth.

Other occupation groups projected to experience a significantly dwindling share of employment are office and administrative support (17) and sales and related occupations (16). These two groupings are important because they include many relatively well-paid existing service occupations that do not require significant education.

On the other side of the occupational change ledger, most groupings are increasing their claim on total employment at modest rates. The major exceptions are healthcare occupations (10 and 11) and education, training, and library jobs (18).

- Nearly one in five new jobs between 2004 and 2014 will accumulate to either healthcare practitioners & technical (10) or healthcare support occupations (11). This is a predictable consequence of the aging of the state's population, which the authors mentioned at the beginning of this paper. It includes some positions requiring high levels of education, but perhaps even more that do not require much education at all. (For an oversimplified image, think of the training needed to give sponge baths or polish shuffleboard courts.)
- Nearly one in ten will accumulate to education, training, and library jobs (8). The more complex and dynamic the economy, the greater will be the need to train and retrain workers.

The state predicts there are five occupational groupings which will increase their claim on total employment at modest rates, defined here as a two-percentage point spread between 2004 employment share and 2004-2014 growth share. These are management (1), business & financial (2), computer and mathematical (3), building and grounds cleaning and maintenance (13), and personal care and service occupations (14). These five occupational categories will account for almost 25 percent of new jobs.

***Adding jobs that will need replacements to “new jobs” reveals the lingering influence of the state’s legacy of goods production and highlights the critical importance of absolute and relative job growth for policymaking.***

“New” jobs differ from the total number of jobs that new workers will need to fill, a total that includes new positions plus jobs that must be filled due to replacement needs (including retirement). Figures V-2 and V-3 portray this issue.

**Figure V-2. Job openings due to replacements, 2004-14.<sup>27</sup>**

	Openings	Share of openings
Total	742,140	100.0%
(1) Management	26,250	3.5%
(2) Business & financial operations	17,500	2.4%
(3) Computer & mathematical	5,390	0.7%
(4) Architecture & engineering	11,870	1.6%
(5) Life, physical, & social sciences	4,860	0.7%
(6) Community & social services	5,690	0.8%
(7) Legal	1,690	0.2%
(8) Education, training, & library	33,000	4.4%
(9) Arts, design, entertainment, sports, & media	7,600	1.0%
(10) Healthcare practitioners & technical	29,970	4.0%
(11) Healthcare support	10,610	1.4%
(12) Food preparation & serving related	99,320	13.4%
(13) Building & grounds cleaning & maintenance	20,080	2.7%
(14) Personal care & service	18,530	2.5%
(15) Construction & extraction	33,060	4.5%
(16) Sales & related	103,200	13.9%
(17) Office & administrative support	104,570	14.1%
(18) Protective service	15,550	2.1%
(19) Farming, fishing, & forestry	2,730	0.4%
(20) Installation, maintenance, & repair	31,780	4.3%
(21) Production	98,380	13.3%
(22) Transportation & material moving	60,510	8.2%

**Figure V-3. Total openings due to replacements (Figure 21) and new jobs (Figure 20), 2004-14.<sup>28</sup>**

Total	Openings 1,082,850	Share of openings 100.0%
(1) Management	44,980	4.2%
(2) Business & financial operations	32,150	3.0%
(3) Computer & mathematical	15,690	1.4%
(4) Architecture & engineering	18,090	1.7%
(5) Life, physical, & social sciences	7,970	0.7%
(6) Community & social services	12,160	1.1%
(7) Legal	4,170	0.4%
(8) Education, training, & library	61,840	5.7%
(9) Arts, design, entertainment, sports, & media	12,570	1.2%
(10) Healthcare practitioners & technical	67,780	6.3%
(11) Healthcare support	29,920	2.8%
(12) Food preparation & serving related	127,420	11.8%
(13) Building & grounds cleaning & maintenance	37,460	3.5%
(14) Personal care & service	31,320	2.9%
(15) Construction & extraction	52,590	4.9%
(16) Sales & related	120,190	11.1%
(17) Office & administrative support	132,680	12.3%
(18) Protective service	20,560	1.9%
(19) Farming, fishing, & forestry	3,060	0.3%
(20) Installation, maintenance, & repair	45,820	4.2%
(21) Production	119,110	11.0%
(22) Transportation & material moving	85,320	7.9%

The most dramatic feature of Figures V-2 and V-3 is the degree to which replacement needs—at 742,120 jobs—outstrip new jobs growth—at 302,610 jobs—as the source of total projected job openings. In analyzing expected occupational change in more detail, the importance of the existing workforce structures becomes apparent. When considering total projected job openings, food preparation and serving related (12), sales and related (16), office and administrative support (17), and production (21) occupations dominate the economy's future workforce needs. Combined, these groups' projected openings account for slightly less than half the economy's total.

An even more fine-grained examination of occupational change shows another dimension: absolute and relative growth of new jobs. Consider the example of the biomedical engineering field,

projected to add 170 new jobs from 2004 to 2014. This level of growth may not seem like much, ranking 287<sup>th</sup> among all occupations, but because it is a new and cutting-edge field the importance of the occupation skyrockets upon measuring the expected change in biomedical engineering jobs as a rate. Total employment is projected to grow by 44 percent, the seventh-highest increase of any occupation. (See Figures V-4 and V-5 below.)

The two dimensions of growth have distinct policy implications. Whether the state chooses to invest public funds in the education of biomedical engineers—a job that requires high levels of difficult education and that is necessary for life sciences growth—could portend a challenge for Indiana workforce preparation and economic growth. The challenge is quite different from the systemic adjustments necessary to anticipate the growth in nurse aides, orderlies, and attendants. These jobs require less postsecondary education, and the state deems that they will grow at a smaller (but still healthy) rate compared to biomedical engineers (20 percent). The absolute increase in this occupation is expected to be much larger, however: 5,930. The large level of new job growth creates an equally important priority but entirely different focus for secondary and postsecondary education policy.

***The fastest growing occupations—as well as those expected to decline the most—highlight the importance of new life-sciences and information-technology jobs. Even so, many jobs requiring little education will need replacement workers.***

Figures V-4 and V-5 compare the two different notions of growth for the most extensively increasing and decreasing occupations.

**Figure V-4. Ten largest projected absolute increases and ten largest projected absolute declines by detailed occupation.<sup>29</sup>**

	2004 emp	2004- 2014 change
Largest increase		
Registered Nurses	51,900	15,400
Team Assemblers	68,950	9,350
Janitors and Cleaners, Except Maids and Housekeeping	48,200	9,280
Retail Salespersons	86,460	7,620
Waiters and Waitresses	48,430	7,130
Truck Drivers, Heavy and Tractor-Trailer	58,660	6,880
Customer Service Representatives	34,450	6,160
Nursing Aides, Orderlies, and Attendants	29,850	5,930
Combined Food Prep, Serv Wrks, Incl Fast Food	60,080	4,720
Home Health Aides	8,910	4,540
Largest decline		
Extruding and Drawing Machine Setters, Operators, and Tender	5,830	-950
Mail Clerks and Mail Machine Operators, Except Postal Svc	2,350	-1,010
Secretaries, Except Legal, Medical, and Executive	40,210	-1,260
Machine Feeders and Offbearers	7,580	-1,270
First-Line Spvrs/Mgrs of Retail Sales Workers	36,770	-1,310
Order Clerks	5,960	-1,710
File Clerks	4,690	-1,730
Cutting, Press Mach Setters, Ops	15,040	-2,610
Cashiers	77,520	-2,970
Stock Clerks and Order Fillers	34,740	-4,730

**Figure V-5. Ten largest projected rate increases and ten largest projected rate decreases by detailed occupation.<sup>30</sup>**

	2004 emp	2004- 2014 change
Largest increase		
Network Systems and Data Communications Analysts	1,980	54.8%
Home Health Aides	8,910	50.9%
Gaming Surveillance Officers and Gaming Investigators	200	49.5%
Medical Assistants	7,830	45.5%
Computer Software Engineers, Systems Software	2,620	45.1%
Computer Software Engineers, Applications	3,920	44.7%
Biomedical Engineers	390	43.9%
Physician Assistants	690	42.9%
Slot Key Persons	500	42.7%
Dental Hygienists	4,030	41.2%
Largest decline		
File Clerks	4,690	-37.0%
Photographic Processing Machine Operators	1,140	-37.3%
Railroad Brake, Signal, and Switch Operators	170	-40.0%
Semiconductor Processors	820	-41.0%
Telephone Operators	330	-42.5%
Mail Clerks and Mail Machine Operators, Except Postal Svc	2,350	-42.8%
Credit Authorizers, Checkers, and Clerks	960	-43.0%
Rail Transportation Workers, All Other	500	-44.8%
Meter Readers, Utilities	1,370	-45.2%
Rail Yard Engineers, Dinkey Operators, and Hostlers	350	-46.6%

Those occupations that are expected to shed jobs in the largest quantities or at the largest rates seem to confirm the idea that more education is necessary. Tables V-6 and V-7 take account of replacement needs.

**Figure V-6. The ten largest increases and ten smallest increases in total 2004-2014 openings by detailed occupation.**

	2004 emp	2004-14 total openings
Largest increases		
Retail Salespersons	86,460	39,050
Cashiers	77,520	37,710
Waiters and Waitresses	48,430	32,050
Combined Food Prep, Serv Wrkrs, Incl Fast Food	60,080	30,760
Team Assemblers	68,950	27,170
Registered Nurses	51,900	26,260
Laborers and Freight, Stock, and Material Movers, Hand	60,530	24,270
Janitors and Cleaners, Except Maids and Housekeeping	48,200	18,420
Truck Drivers, Heavy and Tractor- Trailer	58,660	16,450
Office Clerks, General	52,340	14,800
Smallest increases		
Textile Bleaching and Dyeing Machine Operators and Tenders	20	10
Textile Knitting and Weaving Machine Setters, Ops	100	10
Model Makers, Wood	20	10
Bridge and Lock Tenders	50	10
Traffic Technicians	30	10
Gas Compressor & Pumping Station Ops	50	10
Historians	20	0
Communications Equipment Operators, All Other	20	0
Textile Winding, Twisting, and Drawing Out Machine Setters	20	0
Wellhead Pumpers	20	0



**Figure V-7. Total 2004-2014 openings as a share of 2004 employment: the ten largest increases and ten smallest increases by detailed occupation.**<sup>31</sup>

	2004 emp	2004-14 openings as a share of 2004	
<b>Largest increases</b>			
Protective Service Workers, All Other	3,640	82.4%	Note from this series of tables how important the life sciences—and to a lesser extent, traditional information technology jobs—are to future Indiana growth.
Animal Control Workers	330	81.8%	
Gaming Change Persons and Booth Cashiers	790	81.0%	
Counter Attend., Cafeteria, Food Concession, Coffee Shop	8,520	77.1%	Three of the ten largest absolute increases are for healthcare jobs, with projections for registered nurses being by far the largest.
Choreographers	330	75.8%	
Gaming Cage Workers	1,180	75.4%	
Gaming Surveillance Officers and Gaming Investigators	200	75.0%	When growth is measured relative to the size of original 2004 employment, the importance of healthcare is even more apparent. Five of the ten fastest growing occupations are in healthcare. A further three are in information technology.
Actuaries	390	74.4%	
Ushers, Lobby Attendants, and Ticket Takers	1,690	71.0%	
Dental Assistants	4,880	68.6%	
<b>Smallest increases</b>			
Legal and Related Workers, All Other (OES Only)	670	13.4%	The implications from total openings are quite different from the implications of net job growth. Some jobs are common to the largest increases list in the case of both growth and total openings, such as registered nurses. Certainly, RNs require strong postsecondary training.
Lay-Out Workers, Metal and Plastic	150	13.3%	
Legislators	2,280	12.7%	
Sewing Machine Operators	5,140	12.5%	
Railroad Brake, Signal, and Switch Operators	170	11.8%	
Textile Knitting and Weaving Machine Setters, Ops	100	10.0%	
Historians	20	0.0%	
Communications Equipment Operators, All Other	20	0.0%	
Textile Winding, Twisting, and Drawing Out Machine Setters	20	0.0%	
Wellhead Pumpers	20	0.0%	

Most of the others in the top half of Figures V-6 and V-7 require little—even no—education beyond basic high school competency. Indeed, there is no evident educational or skills-based distinction between the jobs predicted to offer the greatest absolute or relative number of openings and the jobs predicted to offer the smallest absolute or relative number of openings.

***A closer look at education and training requirements confirms the need for more education—a fact even more starkly apparent when comparing education needs for booming and stagnating jobs.***

An analysis of all occupations can address the lack of a clear education and training pattern in the above tables. The Bureau of Labor Statistics assigns a minimum education and training code to each occupation: from short-term, on-the-job training to doctoral or first professional degree. Figure V-8 shows the percentage of 2004 employment, 2004-14 net growth, and 2004-14 total openings by assigned minimum training and education requirement.

As with the educational attainment tables used in this report, the data in Figure V-8 is shown in “cascading” fashion.

**Figure V-8. Cascading education and training requirements for 2004 and 2004-14 projected jobs.<sup>32</sup>**

	Year 2004	Net growth, 04-14	Total openings, 04-14	
short-term on-the-job training or higher	100%	100%	100%	As established, the most extreme pressures for increased education and training come from the jobs that are growing. The share of job growth that requires a postsecondary degree is nearly double the percentage of 2004 jobs that required at least an associate’s degree. This implies a corresponding drop in the jobs that only require on-the-job training or related work experience. A subtraction between the rows in Figure V-8 (the difference between rows is the “non-cascading” percentage of jobs associated with each training
moderate-term on-the-job training or higher	63%	70%	58%	
long-term on-the-job training or higher	39%	55%	38%	
work experience in a related profession or higher	31%	48%	31%	
postsecondary vocational award or higher	23%	43%	25%	
associate's degree or higher	18%	34%	20%	
bachelor's degree or higher	14%	25%	15%	
bachelor's or higher degree, plus work experience or higher	6%	11%	6%	
master's degree or higher	3%	6%	3%	
doctoral or first professional degree or higher	2%	4%	2%	

or education requirement) shows the dramatic extent of the change. Thirty-seven percent of 2004 jobs required only short-term on-the-job training; 30 percent of 2004-14 job growth will require the minimum. In 2004, 24 percent of jobs only required moderate-term on-the-job training; 15 percent of 2004-14 job growth will need moderate-term on-the-job training.

We can explore this issue further by separating occupations that have projections to grow from those with projections to stagnate or decline in employment from 2004 to 2014. Current projections suggest 505 occupations will grow and generate 343,230 new jobs. On the other side of the ledger, the state predicts that 172 occupations will shrink and subtract 37,790 jobs from the total employment base. Figure V-9 shows the education and training profiles of each the two types of occupations.

**Figure V-9. Education and training requirements of occupations that are projected to grow and occupations projected to stagnate or decline from 2004-14.<sup>33</sup>**

	Growing	Stagnating or declining	
Total occupations	505	172	Nearly 90 percent of the job declines in stagnating or shrinking occupations require only short- or moderate-term on-the-job training. Only three percent require any postsecondary education at all (the data in Figure V-9 does not sum to 100 percent due to rounding margins).
Total growth/decline	343,230	-37,790	However, nearly 40 percent of jobs in growing occupations require postsecondary achievement.
short-term on-the-job training	33%	51%	
moderate-term on-the-job training	17%	36%	
long-term on-the-job training	7%	5%	
work experience in a related profession	5%	5%	
postsecondary vocational award	8%	1%	
associate's degree	8%	1%	
bachelor's degree	13%	0%	
bachelor's degree, plus work experience	4%	0%	
master's degree	1%	0%	
doctoral or first professional degree	4%	0%	

***Some jobs opening in the coming years require little education and training, while others require substantial human capital investment, which indicates we need to look more carefully at the future nature of training, education, and on-job experience.***

The difference between net change and total openings smoothes much of the sharp change between the present state educational requirements and the requirements associated with growth. As Figure V-8 suggests, the requirements for all jobs that will come open are fairly similar to the jobs of today. Two differences bear special consideration, however. First, the percentage of total future openings that will require only the barest minimum of education or training—short-term on-the-job training—will be substantially higher than the percentage of present jobs that require only the barest minimum. Conversely, the percentage of future openings that will require moderate-term on-the-job training will be smaller than the percentage of present jobs that require this amount of training.

The second implication of Figure V-8 that bears special consideration is that the biggest differences among jobs requiring postsecondary achievement are for those that require moderate and not advanced postsecondary training. For jobs requiring postsecondary vocational awards or associate's degrees, the difference between their share of total future openings and total 2004 employment is two percentage points. For jobs requiring a bachelor's degree, the difference is one percentage point. For jobs requiring a graduate degree of some type, there is no difference between their share of total future openings and total 2004 employment.

While useful, the Bureau of Labor Statistics' minimum associated requirements used in Figures V-8 and V-9 confuse the differences among formal education, work experience, and training. There is no job for which one of these dimensions of preparation can be overlooked to the total exclusion of the other. Most jobs require a combination of all three. Moreover, the concept of a minimum requirement ignores the reality that workers in a given occupation often have very diverse education, work experience, and training profiles. Even in jobs typically associated with a specific level of education, there is variation. Most college professors have doctoral or first professional degrees but some do not. Most high school teachers have master's degrees but some have doctoral degrees and some have only bachelor's degrees.

The same applies to the vast majority of occupations. To address these significant flaws in the BLS data, we will use a data project called O\*Net.<sup>34</sup> The O\*Net data ascribes dozens of characteristics to occupations. Its coverage includes the estimated percentage of workers in every occupation that have various educational attainment levels. In other words, it estimates

the percentage of CEOs that have doctoral degrees, the percentage that have master's degrees, and so on. Equally valuable, the O\*Net data treats experience and training as separate matters, allowing a user to see the education *and* work experience *and* training profiles associated with different occupations.

*Again, there will be a higher demand for advanced education at the same time there is demand for workers without much education—but the moral of the story ought not to be “stop educating yourself.”*

Figures V-10, V-11, V-12, and V-13 explore the O\*Net-derived differences between the present and future education, experience, and training levels of jobs.<sup>35</sup> Figure V-10 confirms that future job growth will largely result from occupations that require higher levels of education.

**Figure V-10. Cascading O\*Net education levels associated with 2004 employment and 2004-14 projected jobs.<sup>36</sup>**

	2004 total	2004- 14 growth	2004-14 openings	
Less than a high school diploma or higher	100%	100%	100%	The difference is that the actual composition of both present employment and future growth—rather than the minimum required composition—correlates with even higher levels of education.
High school diploma or higher	84%	88%	82%	
Postsecondary certification or some college or higher	45%	58%	44%	
Associate's degree or higher	25%	37%	25%	Figure V-10 is consistent with the minimum required education/training data of Figure V-8 in generating conclusions that run counter to the conventional wisdom
Bachelor's degree or higher	17%	26%	17%	
Master's degree or higher	5%	8%	5%	
Doctoral or first professional degree or higher	2%	4%	2%	
Share of total captured	92%	93%	93%	

that education is the only future. While future job growth correlates with higher levels of education, projections show that the legacy of the existing industrial structure will create large numbers of openings in the economy's lowest skilled jobs. In 2004, for instance, high school dropouts filled 16 percent of jobs, while between 2004 and 2014 18 percent of total job openings will not require a high school diploma.<sup>37</sup>

The counter-argument to the preceding paragraph would be straightforward: the educational profile within occupations will not remain constant, or at least should not. The current educational profile of many occupations may well be less educated than it should be. The argument that many jobs are now filled by workers who are under-educated seems intuitively right and conforms in some ways with the general decline in labor force growth rates. With regard to projections, even this line of thought ignores the possibility that individual occupations may become more complex and require more education in the years ahead. This section will return to these sorts of contextual issues after Figure V-13. They remain an important theme in the projections of experience and training needs, however, as the next tables show.

***Many new jobs will require on-job experience, although we may see a split in the labor market since many replacement jobs will require little work experience, perhaps as employers drop their standards to obtain workers in a tight labor market.***

Figure V-11 suggests that new job growth will correlate with occupations that require more short- and medium-term amounts of related experience than 2004 employment. The difference is slight but also consistent up to the point of jobs associated with more than four years experience. Again, however, the story is quite different as one moves from the notion of future job growth to future job openings. In this case, the expectation is that total openings will occur in jobs that require less related experience than the jobs of 2004.

**Figure V-11. Cascading O\*Net related work experience associated with 2004 employment and 2004-14 projected jobs.<sup>38</sup>**

	2004 total	2004-14 growth	2004-14 openings	
None or more	100%	100%	100%	A similar pattern is evident in the training levels associated with new job growth and projected total openings, as detailed by Figures V-12 and V-13. However, there is some degree of bifurcation in the training levels projected for new job growth. On the one hand, a slightly greater portion of new jobs will require no more training than was true of 2004 jobs.
Any	74%	76%	71%	
More than one month	69%	72%	66%	
More than three months	65%	68%	61%	
More than six months	59%	63%	55%	
More than one year	47%	49%	42%	
More than two years	29%	31%	26%	
More than four years	16%	16%	13%	
More than ten years	5%	3%	2%	
Share of total captured	92%	93%	93%	
				The same comparison is true of jobs requiring only one month or less of training. On the other hand, slightly more new jobs will require between more than one month's and two years' worth of training. Again, the training needs associated with total openings are not only less onerous than those associated with new job growth; they are generally less onerous than those associated with the present. A smaller percentage of open jobs may not require any training at all, or at least not any more than was required by 2004 jobs.

**Figure V-12. Cascading O\*Net onsite or in-plant training associated with 2004 employment and 2004-14 projected jobs.<sup>39</sup>**

	2004 total	2004-14 growth	2004-14 openings	
None or more	100%	100%	100%	This brings us to the seven conclusions with which we began. The education and training data seem to suggest seven main conclusions which we raised at the beginning of this section:
Any	78%	77%	78%	-Future job growth will correlate with substantially higher levels of education,
More than one month	48%	50%	46%	-Future job growth will associate with slightly lower levels of related experience,
More than three months	34%	36%	33%	-Future job growth will associate with slightly lower levels of necessary training,
More than six months	22%	23%	21%	-Future total job openings will correlate with slightly less high school diploma attainment and postsecondary certification,
More than one year	12%	13%	11%	-Future total job openings will associate with roughly equivalent levels of postsecondary degrees but with slightly higher levels of <i>minimum</i> moderate-term postsecondary education needs (postsecondary certification, associate's degrees, bachelor's degrees), and
More than two years	6%	6%	5%	-Future total job openings will correlate with substantially lower levels of related experience, and
More than four years	2%	2%	2%	-Future total job openings will correlate with slightly lower levels of necessary training.
More than ten years	1%	1%	1%	
Share of total captured	92%	93%	93%	

**Figure V-13. Cascading O\*Net on-the-job training associated with 2004 employment and 2004-14 projected jobs.<sup>40</sup>**

	2004 total	2004-14 growth	2004-14 openings	
None or more	100%	100%	100%	Some aspects of this picture are much more plausible than at the beginning of the section. For instance, the new jobs could be a factor of the dynamic “new economy,” and thus have higher demands for education than the replacement jobs, which bear the marks of Indiana’s “old economy.”
Any	90%	87%	89%	This says nothing about whether the new jobs will be good jobs. The beginning of this section identified issues that limit the accuracy and even the utility of official occupational projections.
More than one month	61%	60%	58%	
More than three months	40%	41%	38%	
More than six months	26%	27%	24%	
More than one year	13%	14%	12%	
More than two years	7%	7%	6%	
More than four years	3%	3%	3%	
More than ten years	1%	1%	1%	
Share of total captured	92%	93%	93%	

Section VI discusses a few more conceptual problems that may lead us toward a new way to think about the difference between good jobs and bad jobs in the new economy.



## **VI. Flying Blinder than Usual: Thinking about “Good Jobs” in the New Economy**

*New technology is most likely to upset workforce predictions, and employers may not fully understand what they want their workers to know. Man and machine may ultimately trade skills as industries develop and mature.*

Among possible confounders of Section V’s projections is the inevitable under-appreciation of the impact of technology. Official projections miss many new jobs that grow rapidly over the projection horizon. The classic case is desktop publishing, which in 1990 effectively did not exist. Over the following decade, it was consistently one of the fastest growing jobs. Technological change follows geometric curves, which are exceedingly difficult in forecasting exercises.

To gauge the substitutive and complementary effects of accelerating change on hundreds of specific occupations is ultimately an impossible effort. On the other end of the spectrum, new technology can cause projections to over-predict many occupations. Robotics allow manufacturers to produce far more with less labor. The banking industry needs far fewer workers per transaction than it did two decades ago. In related fashion, the ability of firms to organize production and supply chains on a globally distributed scale as a result of more sophisticated information technology “moved” many of these jobs overseas. In each case, upon reaching tipping points there is a formation of rapid change which can be more or less forecast in a conceptual way but not with specificity. In other words, the impacts are amenable to futurism but not necessarily to methodologically sound quantitative projection. To stay true to the latter is almost certainly to under-predict the true rate of change and mis-predict its effects.

Matching numeric projections of occupational change to the education, experience, and training needs associated with that change injects another layer of difficulty. Ask any group of employers whether they find the workforce to be over-skilled and over-educated or under-skilled and under-educated, and their answers are almost certain to be that their workers are under- rather than over-qualified. Some of this discontent is a perception bias: Who would ever say the workforce is too smart? Some of it is undoubtedly rooted in the declining rate of labor force growth: When it is more difficult to find people in general it is likely to be more difficult to find qualified people. But some part of this perception is undoubtedly a reflection of the workforce’s knowledge and skills in comparison to the knowledge and skills demanded in the workplace. If so, the current educational, experience, and training profile of occupations will inherently pervert an attempt to understand true future needs in the type of analysis used in Figures V-10 through V-13.

Moreover, regardless of the extent to which today’s employers feel forced to hire under-qualified workers, the knowledge and skills needed for specific jobs will inevitably change. Take, again, desktop publishing. In 1990, the critical element of desktop publishing was arguably technical. The software was rare and fairly complex. Since then, word processing and other software advances have been able to absorb some of the desktop publishing functionality. Dedicated desktop publishing programs such as Quark have automated routine tasks. As a result, a relatively smaller share of the value provided by desktop publishers is technical and a relatively greater share increasingly accrues to sub-functions such as design. This evolution received an exclamation point recently when Adobe’s industry-leading “PageMaker” software became Adobe’s new “InDesign” software.

***Some experts worry that the vulnerability of large swaths of the occupational landscape to outsourcing puts even “good jobs” at risk.***

Many worry that information technology allows employers to outsource wholly new categories of jobs directly to other countries, or allows global competition indirectly to limit the domestic growth of new jobs. How many US jobs are vulnerable to this process? Guesses range from a few million jobs to Alan Blinder’s recent estimate that between 26 and 29 percent of the US workforce could be vulnerable.<sup>41</sup> Blinder’s stunning estimate amounts to between 35 and 40 million jobs. He believes his analysis casts much doubt on the worth of the official BLS occupational projects and argues that they almost certainly over-predict the domestic growth of highly “off-shoreable” jobs.

The truly worrisome conclusion from Blinder’s analysis is that the education and skills profiles of the jobs he sees as vulnerable to export vary highly. In other words, while the standard defense of globalization by free trade supporters is that America will lose “bad jobs” and gain “good jobs,” Blinder’s analysis suggests that the effect is likely to be less unidirectional. For example, he ranks computer programmers—a good job by anyone’s definition—as the most vulnerable occupation of all. Blinder’s work has received much attention precisely because he himself is such a champion of free trade and an unfettered global marketplace.

***“Personal service” jobs are hardest to outsource so Blinder recommends focusing education and training on “invulnerable jobs.”***

Blinder’s key assumption in generating estimates that are so much larger than others derives from his treatment of services jobs. Like others, he acknowledges that goods production is particularly amenable to globally distributed production. He goes farther than other economists in his assessment of the services occupations, which he sees as capable of being performed across a distributed geographic arrangement. The critical difference, for him, is between “personal” service jobs and “impersonal” service jobs. Hence, much of healthcare is only deliverable to the geographic point of consumption and is not off-shoreable. Computer programming, which is not geographically constrainable, is vulnerable.

Blinder’s conclusion is that the current US education and training approach and even most proposals for education training reform are strategically incorrect. He thinks today’s students and displaced workers should receive education and training for those jobs that are relatively safe from global market pressures. In this formulation, invulnerable jobs are the “good” jobs—and vulnerable jobs, no matter how high-paying, are not. Both the breadth and depth of this challenge to the conventional wisdom about how to prepare students and workers for the global economy command real power—and demand consideration by policymakers and business leaders as they try to plot a course through the next two decades. If one accepts Blinder’s categorization of “personal” and “impersonal” service jobs, his policy suggestions would seem to make intuitive sense.

***While this may overburden schools and colleges, it opens new perspectives for educators and reformers who have to pay attention to the geographic and social context of technology.***

At heart, though, Blinder’s approach is still demand-driven. It thus falls prey to the same weaknesses of all demand-driven strategies for workforce development. In a highly volatile job market that may require the possession of multiple skill and knowledge sets over a work life, longer-term formal education may be more useful than shorter-term and job-specific education or training. Moreover, and as discussed earlier, experience, training, and formal or third-party-provided education can become substitutes for each other over time. If formal education increasingly substitutes for the other two, there may be unwelcome institutional implications for

the postsecondary system if it skews too far as a perfect substitute for the other two. Approaches such as Blinder's could increase their vulnerability.

Settling the age-old debate between those who advocate for an occupational demand- and skill-driven education system and those who advocate for a more classic vision is well beyond the scope of this report. The exciting aspect of Blinder's work is how an effort conceived partly in criticism of official occupational projections, with a novel and radical policy conclusion, nonetheless creates a recommendation functionally similar to the demand-driven approach of those who would use the official occupational projections to apportion education and training resources.

This is less surprising when one considers what both approaches share in common: an analytical framework that emphasizes the effect of exogenous changes on individual occupations. An alternative understanding—implicit if not explicit in much of the literature about occupational concentration dynamics—emphasizes that:

- the changes among individual occupations are a function of their changing substitutive and complementary relationships with other occupations, and
- geography informs the quality of these relationships.

In other words, the prospects of a given occupation are not foremost a function of the prospects of the industry in which the occupation is found, as with the official BLS projections. Nor are the prospects of a given occupation foremost a function of the ability of technological change to unmoor it from dependence on a specific place, as in Blinder's analysis. Instead, the prospects of a given occupation are a function of the value it contributes to and the value it derives from other occupations in a specific place, relative to the value it would contribute to and the value it would derive from those same, other occupations in a different place.

For example, among the most off-shoreable occupations in Blinder's list are film and video editors, with a rank of ninth-most off-shoreable, and graphic designers, with a rank of 86<sup>th</sup>-most off-shoreable. No doubt one could perform the technical aspects of both occupations anywhere (though the bandwidth associated with internationally dispersed digital film editing would be extreme, to say the least). However, the value of both occupations is a function of much more than their technical substance. Few film directors would surrender the opportunity to work alongside their editors and guide the compilation of video or film material into a whole work. The quality of a graphic design artifact is intimately connected to designers' interaction with clients and usually develops from an iterative process that is not readily amenable to a purely virtual space for that interaction.

***A technology that might make some jobs vulnerable to off-shoring could also offer opportunities for people in proximity to work creatively—and vice versa.***

Both occupations also demonstrate the ways in which the same changes in information technology that would seem to promote the geographic unmooring of occupations may promote the opposite. For example, in film and video editing, the development of film-quality, high-definition video cameras led to innovative uses of the editing process. To create the most recent two installments of his "Star Wars" films, George Lucas spatially and temporally joined the editing function to the filming function. As they shot footage, they sent it in real-time to a video editing station. They used this footage to create an initial working edit of the film in near real-time. As the director, Lucas then used the nearly immediate working edit to make decisions about re-shoots and adjustments to specific aspects of the original narrative vision.

An emphasis on occupations' relationships to other occupations in a geographic space can also help explain the rapid growth of metropolitan areas as centers of employment and innovation at the expense of rural areas. Again, this outcome is the opposite of what many predicted at the dawn of the networked age. After all, the typical rural area is a far cheaper place to do business than a typical major metropolitan area when it comes to issues of real estate costs, wages, transportation, and so on. Hence, one might have expected to see both off-shoring and "ruraling" over the course of the 1990s. That the latter did not occur suggests that the value relationships of some occupations could be nearly totally unbundled from fidelity to place, while the value relationships of other occupations became much more dependent on place.

The key argument about this process is whether it is the technological dynamics that drive it—making some jobs or even the same job both more and less geographically dependent and thus having an endpoint—or whether they are an ongoing and permanent force. In other words, will information technology ever stop creating examples like George Lucas's new approach to video editing and just make jobs exportable as a result of their technical function? Or will information technology always create new reasons for personal interaction and spatial collocation even as it creates new opportunities to perform technical functions impersonally and irrespective of geography?

***If geography matters, education might matter even more—at least the right kind of education.***

To answer the first question "yes" and the second question "no" is to make a radical leap from the past. It is also to cast globalization in many of the terms so feared by its detractors. If one answers these questions in the opposite fashion, however, the maxims about the need for generally higher education and skills become more applicable.

A continuation of this dynamic could also fuel continued growth of the income gap between the less and more educated. While one rarely considers this gap in terms of the growth (or decline) of the populations with various levels of educational attainment, the two in combination create a stunning suggestion of relative demand. The populations with higher levels of attainment are growing much faster (in other words, increasing the quantity of labor supplied) much more quickly than the populations with low levels of education. In fact, the US population without a high school diploma is actually shrinking, having declined by 17 percent between 2000 and 2005.

***How to network across cultures could become essential, which is different than just saying "learn more" or "stay in school"—it could mean "learn to adapt."***

This decline has yet to translate into higher wages for high school dropouts, of course, as would ordinarily be the case with a diminishing quantity of labor supplied. That it has not hints at the incredible collapse of labor demand for the poorly educated. Obviously, the changes in income for those at the top of the educational ladder provide the opposite hint, despite the perpetually dramatic increase in their sizes.

It may well be that a kind of network effect is influencing these changes. If occupational growth is a function of the value each occupation contributes to and derives from other occupations, then the injection of ever larger numbers of workers who can fill the highest value occupations may drive demand for even more workers to fill such occupations. This notion is not inconsistent with many of the locational dynamics behind population growth and industrial change in major metropolitan areas that become centers of innovation.

The beginning of this section questioned how to create a more nuanced guide for education and training preparation than general recommendations for “more” of both. It ends by arguing that, to a great extent, the general recommendation is good policy. Official labor force projections, rooted in recent industrial structure and trends and overly-cautious in the application of expected technological change, have worth in the short-term. Ignoring the time lag between occupational surveys and the data reporting of them, a picture of the short-term past is not a bad guide for predicting the short-term future. As a base for longer-term decisions, the use of the standard official projections series is more dubious.

Instead, the better approach would seem to be the embrace of fluidity. Ultimate occupational demand is likely a function of complex relationships among various occupations and often in a way that is unique to place. In essence, this is somewhat akin to an occupational version of the industry cluster concept that is now so ubiquitous in economic development. This admittedly makes the future more opaque. It also makes the future more shapeable. Indiana would be wise to think about the education and training needs of the future as less a function of projection series and more a function, as with “Accelerating Growth,” of where the state wants to go.

## VII. One Planet, Many Countries: Two Worlds of Foreign-Born Education

Discussions of immigration often seem to be expressed in “us” and “them” terms, native-born citizens and foreign-born immigrants. The previous sections ought to have made clear that when talking about “us” native-born Hoosiers, there is a wide range of diversity. Economic growth, for instance, means very different things depending on where you live, or what you studied in school. This section looks at the diversity in “them,” in particular at educational differences among immigrants. The larger portion of Indiana’s growing immigrant population has minimal education and few advanced skills. The smaller part stands at the peak of the global education and skills pyramid, vital to the area’s most important industries and prosperous firms.

Figure VII-1 shows a “cascading” educational attainment profile for Indiana residents over the age of 25. An alternative to the standard educational attainment data, which report the number of a population who qualify for each distinct category, the cascading profile reports the number who qualified for each distinct category or better. Thus, Figure VII-1 shows that 86 percent of Indiana’s 25 and older non-foreign-born population graduated high school. Of this 86 percent, 48 percent of the total 25 and older non-foreign-born cohort went on to college.

**Figure VII-1. The cascading educational attainment profile of the 25+ foreign and non-foreign-born, 2005: Indiana.<sup>42</sup>**

Possess at least...	non-foreign-born	foreign-born
at least a high school diploma	86%	68%
at least some college	48%	44%
at least a bachelor’s degree	21%	27%
graduate degree	7%	14%

The conclusions from VII-1 are stark. The foreign-born population in Indiana is much less likely to have graduated high school than their domestic-born or native counterparts. Almost one in three foreign-born Hoosiers lack a high school diploma; one in seven US-born Hoosiers lack a high school degree. The foreign-born are also much more likely to hold a bachelor’s degree than their domestic-born or native counterparts. They are twice as likely to possess a graduate degree.

Differences become even greater when immigrants’ region of origin is separated, as in the cascading attainment profile of Figure VII-2.

**Figure VII-2. The cascading educational attainment profile of the 25+ by region of origin, 2005: Indiana.<sup>43</sup>**

	Africa	Asia	Canada & Oceania	Europe	Latin America	US born
No diploma	100%	100%	100%	100%	100%	100%
Diploma	82%	87%	92%	85%	47%	86%
Some college	69%	72%	70%	47%	21%	48%
Associates	51%	60%	62%	31%	11%	28%
Bachelors	36%	54%	56%	24%	8%	21%
Masters	15%	23%	30%	12%	3%	7%
Doctorate or first professional	7%	3%	16%	4%	2%	2%

A significant portion of the state’s immigrant population is connected with a large body of foreign students and faculty on the state’s higher education campuses.<sup>44</sup> Foreign-born students are concentrated among the Indiana’s larger research universities, as shown in Figure VII-3.

**Figure VII-3. Fall 2004 non-resident alien enrollment by institution.**<sup>45</sup>

Purdue University system	4,905	The four-year institutional enrollments shown in Figure VII-3 are relatively high. For example, the percentage of Purdue University-West Lafayette’s student body that is non-resident alien is higher than the percentage of any public California four-year campus. The degree to which the non-resident alien percentage of
Indiana University system	3,658	
University of Notre Dame du Lac system	1,060	
Indiana University/Purdue University cooperative system	1,017	
University of Indianapolis	672	
Indiana State University	448	
Ball State University	205	
University of Evansville	104	
University of Southern Indiana	101	
Other public four-year	854	
Public two-year	88	

enrollment would increase with a more prosperous Indiana future is an open question. Neither Indiana University’s nor Purdue’s admissions policies are under formal obligation to give quantitative preference to in-state students, at least not at their main campuses. While their missions and charters give informal preference, budget constraints make out-of-state students attractive, though in a more prosperous Indiana economy, the tightness of these constraints could relax.

While non-resident alien enrollment in the state’s public four-year universities is relatively high, the enrollment in Indiana’s two-year universities is shockingly low. The total reported enrollment for this category is 88 students, representing a scant one-tenth of one percent of total enrollment.

This does not make Indiana unusual. Even California, with its enormous foreign-born population, has a non-resident alien enrollment of just 1.4 percent in its two-year college system. Illinois’ is 0.4 percent. Indiana’s low rate is thus a reflection of the college attendance patterns of a particular segment of the foreign-born, Hispanics. A measure of this behavior is shown in Figure VII-4.

**Figure VII-4. Percentage of 15-17 year olds attending school and 18-24 year olds attending college, by race/ethnicity**<sup>46</sup>

<i>15-17 year-olds attending school</i>		<i>18-24 year-olds attending college</i>	
Hispanic	88%	Hispanic	9%
Asian	97%	Asian	74%
Total	94%	Total	34%

Even at the secondary level, Hispanic attendance lags far behind the rest of the state. At the college level, their attendance is truly comparably miniscule. As the fastest growing source of population growth in the state, Hispanic high school and college attendance patterns totally imperil the future growth envisioned by the previous sections of this Working Paper. The striking degree of difference in Hispanic attendance patterns, as well as their general uniformity across the nation, suggests that the solution must truly be a systemic one. This will be true of the primary and secondary systems. It may be particularly true of the post-secondary system and involve the creation of institutional structures different from anything that has been seen before.



## Appendix 1

### The Foreign-Born Population of Indiana

As Figure A-1 reveals, Indiana's foreign-born population comes from all over the world, with one country of origin standing far above any other.

**Figure A-1. Indiana's foreign-born population, 2005: country of origin and population<sup>47</sup>**

Mexico	98,698	Jamaica	2,022	Brazil	853	Bangladesh	445
China	13,252	Greece	1,918	Hungary	767	Other N Amer	443
India	10,628	Romania	1,901	Syria	751	Other Oceania	402
Germany	8,042	Yugoslavia	1,730	Cuba	693	Spain	393
Korea	7,823	Honduras	1,699	Turkey	690	Argentina	388
Canada	6,784	Kenya	1,324	South Africa	669	Guyana	364
Other Africa	6,694	Laos	1,317	Nigeria	643	Iraq	357
Other Europe	6,148	Thailand	1,315	Czech Rep & Slov	605	Afghanistan	325
United Kingdom	5,779	Croatia	1,217	Indonesia	568	Ghana	303
Vietnam	5,423	Venezuela	1,217	Ethiopia	532	Panama	276
Philippines	5,123	Italy	1,090	Trinidad & Tobago	526	Chile	220
Japan	4,985	Pakistan	1,084	Dominican Republic	510	Ecuador	205
Other Asia	3,831	Netherlands	1,075	Israel	505	Nicaragua	199
El Salvador	3,667	Iran	1,025	Haiti	482	Bolivia	195
Guatemala	3,388	Bosnia & Herz	1,008	Liberia	477	Lebanon	193
Poland	2,688	Other Latin America	999	Costa Rica	465	Cambodia	163
Peru	2,647	France	927	Ireland	465	Uruguay	71
Ukraine	2,627	Colombia	868	Austria	459	Armenia	61
Russia	2,462	Egypt	862	Australia	457	Portugal	59

At more than forty percent, the share of Mexican-born in Indiana's foreign-born population is higher than Mexicans' share in the foreign-born population of the US as a whole, and much higher than its neighbors besides Illinois.

**Figure A-2. Three top countries of birth for foreign-born, 2005 (Country and percent of state's immigrant pop.)<sup>48</sup>**

Indiana		Illinois		Michigan		Ohio		Kentucky		US	
Mexico	40.7%	Mexico	40.9%	Mexico	14.1%	Mexico	10.2%	Mexico	24.6%	Mexico	30.7%
China	5.5%	Poland	8.9%	India	8.6%	India	8.2%	Germany	6.2%	China	4.9%
India	4.4%	India	6.1%	Canada	7.7%	China	6.5%	India	5.9%	Philippines	4.5%

Section III discussed the settlement patterns of immigrants in Indiana. Figure A-3 shows in more detail where they have been settling.

**Figure A-3. Indiana's Foreign-born population as a share of counties' total population, 2005.<sup>49</sup>**

County	Foreign-born Pop.	Share of total Pop.	County	Foreign-born Pop.	Share of total Pop.	County	Foreign-born Pop.	Share of total Pop.	County	Foreign-born Pop.	Share of total Pop.	County	Foreign-born Pop.	Share of total Pop.
Tippecanoe	12,167	8.17%	Jackson	991	2.40%	Boone	683	1.48%	Hancock	508	0.92%	Clay	150	0.56%
Elkhart	12,982	7.10%	Newton	340	2.33%	Delaware	1,754	1.48%	Gibson	298	0.92%	Henry	259	0.53%
Monroe	6,566	5.45%	Carroll	435	2.16%	Montgomery	546	1.45%	Spencer	682	0.90%	Parke	88	0.51%
Lake	25,848	5.33%	LaGrange	738	2.11%	Steuben	473	1.42%	Morgan	580	0.87%	Fayette	130	0.51%
Noble	2,260	4.88%	Dubois	828	2.09%	Warrick	656	1.25%	Wells	233	0.84%	Washington	136	0.50%
Clinton	1,613	4.76%	Fulton	412	2.01%	Jefferson	381	1.20%	Huntington	321	0.84%	Switzerland	45	0.50%
Marion	39,386	4.58%	Vigo	2,119	2.00%	Grant	874	1.19%	Whitley	256	0.83%	Posey	130	0.48%
St. Joseph	184	4.56%	Daviess	571	1.91%	Madison	1,587	1.19%	Dearborn	381	0.83%	Greene	152	0.46%
Marshall	1,998	4.43%	Howard	1,487	1.75%	Floyd	825	1.16%	Orange	158	0.82%	Scott	113	0.41%
Cass	1,763	4.31%	Clark	1,686	1.75%	Knox	430	1.10%	DeKalb	322	0.80%	Perry	78	0.41%
Allen	13,394	4.04%	Johnson	1,971	1.71%	Putnam	389	1.08%	Benton	74	0.79%	Owen	87	0.40%
Hamilton	7,283	3.99%	Vanderburgh	2,794	1.63%	Adams	360	1.07%	Pulaski	108	0.79%	Union	28	0.38%
Bartholomew	2,683	3.76%	Decatur	394	1.60%	Tipton	173	1.04%	Vermillion	131	0.78%	Crawford	36	0.34%
White	894	3.54%	Hendricks	1,663	1.60%	Fountain	185	1.03%	Randolph	200	0.73%	Warren	27	0.32%
Porter	4,359	2.97%	Shelby	95	1.57%	Brown	151	1.01%	Jennings	201	0.73%	Rush	55	0.30%
Kosciusko	2,142	2.89%	Wayne	1,086	1.53%	Miami	345	0.96%	Wabash	239	0.68%	Sullivan	61	0.28%
Starke	619	2.63%	Jay	330	1.51%	Harrison	319	0.93%	Ripley	179	0.67%	Martin	27	0.26%
LaPorte	2,730	2.48%	Jasper	452	1.50%	Lawrence	425	0.93%	Franklin	143	0.65%	Blackford	19	0.14%
									Pike	74	0.58%	Ohio	6	0.11%

The beginning of this section showed greater diversity of the foreign-born population in Indiana than many people assume. Of the 92 counties in Indiana in 2000, in only 38 did a majority of the foreign-born population originate from even a single region or the world. Only 19 counties had populations that originated from a single country. The following narrative and table examine the county-by-county patterns of these populations in the context of their places of origin.

**Figure A-4. The share of foreign-born population by Indiana's major cities' home counties, 2000.<sup>50</sup>**

	Allen County	Lake County	Marion County	St. Joseph County	Vanderburgh County
Total:	13394	25848	39386	12113	2794
Europe:	23.56%	34.91%	17.88%	25.23%	26.70%
Asia:	28.80%	14.24%	26.33%	25.06%	50.64%
Eastern Asia:	4.32%	3.79%	8.14%	11.29%	17.82%
China:	1.49%	1.30%	4.37%	5.32%	5.91%
South Central Asia:	6.82%	4.55%	7.73%	5.30%	11.42%
India	4.40%	3.64%	5.37%	4.18%	8.70%
Western Asia:	1.47%	1.92%	1.41%	2.77%	5.55%
Africa:	3.96%	2.47%	7.21%	6.55%	0.79%
Americas:	43.53%	48.20%	48.14%	42.76%	21.55%
Latin America:	37.56%	46.18%	45.76%	36.79%	17.14%
Central America:	31.07%	43.23%	38.83%	32.45%	8.63%
Mexico	27.23%	41.79%	33.57%	29.92%	8.63%
South America:	3.86%	1.43%	3.45%	3.21%	4.80%
Northern America:	5.97%	2.02%	2.38%	5.98%	4.40%

A large European contingent represented the majority of foreign-born populations in nine counties—Benton, Boone, Crawford, Greene, Henry, Martin, Owen, Parke, and Starke. Not surprisingly, these counties are not major destinations for Indiana's current wave of immigration. Of the nine, all but Starke (first quartile) and Boone (second quartile) fell in the bottom half of all counties in terms of their share of foreign-born population. Combined, these nine counties claimed only 2,025 of Indiana's 186,534 total Year 2000 foreign-born population.

There were six counties in which the majority of the foreign-born population was majority Asian: Blackford, Decatur, Monroe, Tipton, Vanderburgh, and Wabash. An additional six counties had a foreign-born population that was significantly (40 percent-49 percent) Asian: Delaware, Hamilton, Rush, Switzerland, Tippecanoe, and Vigo. The fact that three of these counties—Delaware, Tippecanoe, Monroe, and Vigo—are home to major centers of higher education is obviously no coincidence.

Again, however, most of these heavily Asian counties are not heavily immigrant. Only two—Vanderburgh and Decatur—had a share of the population that was foreign-born population which ranked in the upper half of all Indiana counties.

Twenty-three Indiana counties had a foreign-born population in which a majority was from Latin America. These counties included Carroll, Cass, Clinton, Daviess, Dubois, Elkhart, Fulton, Harrison, Jackson, Jay, Kosciusko, LaGrange, Marshall, Montgomery, Newton, Noble, Ohio, Pulaski, Randolph, Spencer, Steuben, Warren, and White. Of these, only in Dubois County was a majority not claimed by the Mexican-born.

These counties are most definitely major destinations for Indiana's new waves of immigrants. Nearly half are in the first quartile of all counties in terms of the share of total population that is foreign-born: Elkhart, Noble, Clinton, Marshall, Cass, White, Kosciusko, Jackson, Newton, Carroll, LaGrange, and Dubois. Only two are in the bottom quartile—Orange and Ohio.

The five major cities in Indiana—Indianapolis, Fort Wayne, Evansville, South Bend, and Gary—are located within Marion, Allen, Vanderburgh, St. Joseph, and Lake County, respectively. Marion, Lake, and Allen all had the three largest stocks of foreign-born populations in the state. St. Joseph County had a much smaller foreign-born population, but was also located in the first quartile of all counties in terms of the share of total population that was foreign born. Vanderburgh County was in the second quartile.

The larger cities' immigrant populations are relatively diverse, as shown in Figure 6. However, their foreign-born populations were by no means evenly spread over geographic regions. The Latin American populations in Allen, Lake, Marion, and St. Joseph Counties were all 40 percent or more of the foreign-born population. All but Lake County had foreign-born populations that were at least one-quarter Asian (with Vanderburgh County more than 50 percent Asian).

## About the Project

### ***Project Team***

Dr. John Clark (john@sipr.org) is a Senior Fellow at Sagamore Institute and serves as the Immigration and Higher Education project's senior researcher. Clark has conducted research in a range of fields, including community-based organizations, education reform and human capital, energy security, trade and development. His most recent research project at Sagamore was the "Connecting Mexico and the Hoosier Heartland" study, which identified and examined the growing economic and cultural linkages between Mexico and Indiana. In addition, he recently completed a study on East and Central European immigrants in Indiana. Prior to joining Sagamore, Clark was a Senior Fellow at Hudson Institute. During his tenure at Hudson, he served as a research fellow, senior fellow, director of the Center for Central European and Eurasian Studies and assistant director of research. Clark received his B.A. from the University of Washington, and he earned his M.A. and Ph.D. in Political Science from the University of California at Berkeley.

Justin Heet (justin@sipr.org) is an Associate Fellow with Sagamore Institute and Senior Principal for policy research and analysis at Thomas P. Miller and Associates (TPMA). He is the chief research analyst on the Immigration and Higher Education project. In 2006, Heet contributed to Sagamore's "Connecting Mexico and the Hoosier Heartland" study. At TPMA, Heet specializes in the analysis of demographic and workforce trends. In addition to these two areas, his experience is highly multi-disciplinary, due to his interests in research methodologies and the effect of technological change on the workplace and government. Earlier, he served as a research fellow at Hudson Institute, where he contributed to Hudson's *Workforce 2020* project, education research, e-government studies, and *Beyond Workforce 2020: Global Work and Workers in the 21st Century*. Heet graduated from Indiana University in Economics and Political Science.

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### ***About Sagamore Institute for Policy Research***

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- <sup>1</sup> Timothy J. Hatton and Jeffrey G. Williamson, *The Age of Mass Migration: Causes and Economic Impact* (New York: Oxford University Press, 1998).
- <sup>2</sup> *World Population Prospects: The 2006 Revision* (New York: UN Department of Economic and Social Affairs, 2007) [http://www.un.org/esa/population/publications/wpp2006/wpp2006\\_highlights.pdf](http://www.un.org/esa/population/publications/wpp2006/wpp2006_highlights.pdf).
- <sup>3</sup> US Bureau of the Census, Census 2000; American Community Survey 2005: [www.census.gov](http://www.census.gov).
- <sup>4</sup> US Bureau of the Census: Population Projections Program [www.census.gov](http://www.census.gov).
- <sup>5</sup> US Bureau of the Census: Population Projections Program [www.census.gov](http://www.census.gov).
- <sup>6</sup> James Levine, Justin Heet, and Barbara Burlingame, "Aging on the Job," *Science of Aging Knowledge Environment* June 28 2006, p. 16.
- <sup>7</sup> Another strategy to increase the workforce might be called pro-natal: reverse fertility declines by encouraging more babies. Countries such as Germany and Singapore have adopted pro-natal policies to reverse their shrinking workforces, with little success. Insofar as the leading cause of fertility declines in developed societies is female education, pro-natal workforce development strategies could be contradicted by efforts to increase the education of workers. Dirk J. van de Kaa, "Temporarily New: On Low Fertility and the Prospect of Pro-Natal Policies," *Vienna Yearbook of Population Research* 2006 pp. 193-211, [http://www.oaaw.ac.at/vid/publications/VYPR2006/VYPR2006\\_vandeKaa\\_pp.193-211.pdf](http://www.oaaw.ac.at/vid/publications/VYPR2006/VYPR2006_vandeKaa_pp.193-211.pdf).
- <sup>8</sup> The Migration Policy Institute has put together a nice pack of information about Indiana's immigration and how the state compares to the country as a whole: <http://www.migrationinformation.org/datahub/state.cfm?ID=IN>
- <sup>9</sup> US Census Bureau: various data [www.census.gov](http://www.census.gov).
- <sup>10</sup> The project team recognizes that the terms "Hispanic" and "Latino" are often erroneously used interchangeably, and that the communities represented by these terms are not a monolith. For ease of reference and for the sake of brevity, this paper will use the term "Latino/Hispanic" to identify peoples of Latin American descent and/or people who speak Spanish as their primary language (unless otherwise differentiated, as in Section VII). This is a generally accepted convention in journalism and public policy.
- <sup>11</sup> Richard Florida, *The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life* (New York: Basic Books 2003); *The Flight of the Creative Class: The New Global Competition for Talent* (New York: Collins, 2007).
- <sup>12</sup> John Austin and Britany Affolter-Caine, *The Vital Center: A Federal-State Compact to Renew the Great Lakes Region* (Washington DC: The Brookings Institution October 2006). [http://media.brookings.edu/mediaarchive/pubs/metro/pubs/20061020\\_RenewGreatLakes.pdf](http://media.brookings.edu/mediaarchive/pubs/metro/pubs/20061020_RenewGreatLakes.pdf)
- <sup>13</sup> The National Science Board, Science and Engineering Indicators 2006 <http://www.nsf.gov/statistics/seind06/>.
- <sup>14</sup> Richard Florida, "The World is Spiky," *The Atlantic Monthly*, October 2005.
- <sup>15</sup> Combined statistical area (CSAs) combine two or more metropolitan and micropolitan areas (MSAs). The Indianapolis CSA is more accurately the Indianapolis-Anderson-Columbus CSA. For more on this new way of aggregating statistics, see Carol O. Rogers, "A New Metro Landscape for Indiana," *InContext* 4:4 (July-August 2003), <http://www.incontext.indiana.edu/2003/july-aug03/details.html>.
- <sup>16</sup> Data in Figure 8 are cumulative net migration data from the Census Bureau's Population Estimates Program. In both source and focus, these data are different from the net population change analysis derived from the Census Bureau's American Community Survey.
- <sup>17</sup> Christine Nolan, "Industry Clusters: Part of Indiana's Strategic Planning Toolkit," *INContext* September – October 2004 <http://www.incontext.indiana.edu/2004/sep-oct04/news.html>.
- <sup>18</sup> Michael Porter, *The Competitive Advantage of Nations* (New York: Basic Books, 1990). For an overview of this consensus see Jessica LeVeen, "Industry Cluster Literature Review" <http://www.planning.unc.edu/courses/261/leven/litrev.htm>.
- <sup>19</sup> *Accelerating Growth: Indiana's Strategic Economic Development Plan* (2006) [http://www.in.gov/iedc/pdfs/Strategic\\_Plan.pdf](http://www.in.gov/iedc/pdfs/Strategic_Plan.pdf).
- <sup>20</sup> <http://www.ipic.org/> The Indianapolis Private Industry Council relies on more fine-grained industry definition than in Figure IV-1, which reports trends for the 3-digit industries containing the detailed industries used by IPIC.
- <sup>21</sup> STATS Indiana: Covered Employment and Wages [www.stats.indiana.edu](http://www.stats.indiana.edu).
- <sup>22</sup> Haya El Nasser, "Population boom spurs super cities," *USA Today* 10 July 2005 [http://www.usatoday.com/news/nation/2005-07-10-megacities\\_x.htm](http://www.usatoday.com/news/nation/2005-07-10-megacities_x.htm). For more information, see the Metropolitan institute at Virginia Tech: <http://www.mi.vt.edu/>
- <sup>23</sup> Micro-politan areas are considered to be less-populated communities in rural areas. As a recent USA Today report explained, these communities "increasingly fill the gaps on the map between major cities...For scholars and urban planners, the new category more accurately reflects changes across the country brought on by development, migration and the shift from farming and manufacturing to an economy dominated by service industries." More than 28 million Americans live in micro-politan areas. For more on these areas, see Haya El Nasser, "Small-town USA goes micropolitan," *USA TODAY*, June 27, 2004.



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<sup>24</sup> US Bureau of the Census: Migration Data and Reports [www.census.gov](http://www.census.gov). Note: The net migration relationships are with only neighboring counties or metro or micropolitan areas AND Indianapolis, Chicago, Cincinnati, and Louisville.

<sup>25</sup> For much more on this topic, see Neil Howe and Richard Jackson's *Long-Term Immigration Projection Methods: Current Practice and How to Improve It*. (DC: CSIS Global Aging Initiative, June 2006), [http://www.csis.org/images/stories/Global\\_percent20Aging\\_percent20Initiative/060627\\_immigration\\_report.pdf](http://www.csis.org/images/stories/Global_percent20Aging_percent20Initiative/060627_immigration_report.pdf).

<sup>26</sup> Indiana Department of Workforce Development: Research and Analysis Long-Term Occupational Projections [www.dwd.in.gov](http://www.dwd.in.gov).

<sup>27</sup> Ibid.

<sup>28</sup> Ibid.

<sup>29</sup> Ibid.

<sup>30</sup> Ibid.

<sup>31</sup> Ibid.

<sup>32</sup> Ibid.

<sup>33</sup> Department of Labor Bureau of Labor Statistics: Occupational Projections and Training Data [www.bls.gov](http://www.bls.gov).

<sup>34</sup> Occupational Information Network: O\*NET OnLine [www.online.onetcenter.org](http://www.online.onetcenter.org).

<sup>35</sup> Not every occupation has been examined by O\*Net. As a result, the occupations covered in the following tables does not totally account for all the occupations covered in Figures V-8 and V-9. In the case of Year 2004 employment, 92 percent of employment was covered. In the case of 2004-14 growth and total openings, 93 percent of the projected change was covered. This is shown in the final row of Figures V-10-13. An additional difficulty is present in the O\*Net data. In many cases, O\*Net describes a level of specificity that goes beyond the occupation itself, effectively creating sub-occupations. In such cases, this report created a weighted average of the sub-occupation profiles, using the sample size of each sub-occupation. In effect, it assumed that the relative sizes of the O\*Net samples correspond to the relative employment sizes of the sub-occupations. This is an admittedly problematic assumption but a necessary one to create workable occupation data. In defense of the assumption, there is obviously extreme similarity among related sub-occupations.

<sup>36</sup> Occupational Information Network: O\*NET OnLine, [www.online.onetcenter.org](http://www.online.onetcenter.org).

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.

<sup>40</sup> Ibid.

<sup>41</sup> Alan S. Blinder, "Free Trade's Great, but Offshoring Rattles Me," *The Washington Post* May 6 2007.

[http://www.washingtonpost.com/wp-dyn/content/article/2007/05/04/AR2007050402555\\_pf.html](http://www.washingtonpost.com/wp-dyn/content/article/2007/05/04/AR2007050402555_pf.html).

<sup>42</sup> See [www.census.gov](http://www.census.gov).

<sup>43</sup> See [www.census.gov](http://www.census.gov).

<sup>44</sup> See Rachel Justis, "A Closer Look at Indiana's College Counties," *InContext* 7:1 (January 2006): pp. 4-6

[http://www.incontext.indiana.edu/2006/january/pdfs/2\\_college.pdf](http://www.incontext.indiana.edu/2006/january/pdfs/2_college.pdf).

<sup>45</sup> US Department of Education's Integrated Postsecondary Education Data System, <http://nces.ed.gov/ipeds/>.

<sup>46</sup> See [www.census.gov](http://www.census.gov).

<sup>47</sup> Census Bureau, *2005 American Community Survey* [www.census.gov](http://www.census.gov).

<sup>48</sup> US Census Bureau, *2005 American Community Survey* from Migration Policy Institute Data Hub, <http://www.migrationinformation.org/datahub/acscensus.cfm?CFID=8905774&CFTOKEN=91649163#>

<sup>49</sup> Census Bureau, *2005 American Community Survey* [www.census.gov](http://www.census.gov).

<sup>50</sup> Census 2000, [www.census.gov](http://www.census.gov).